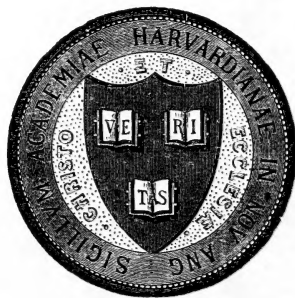
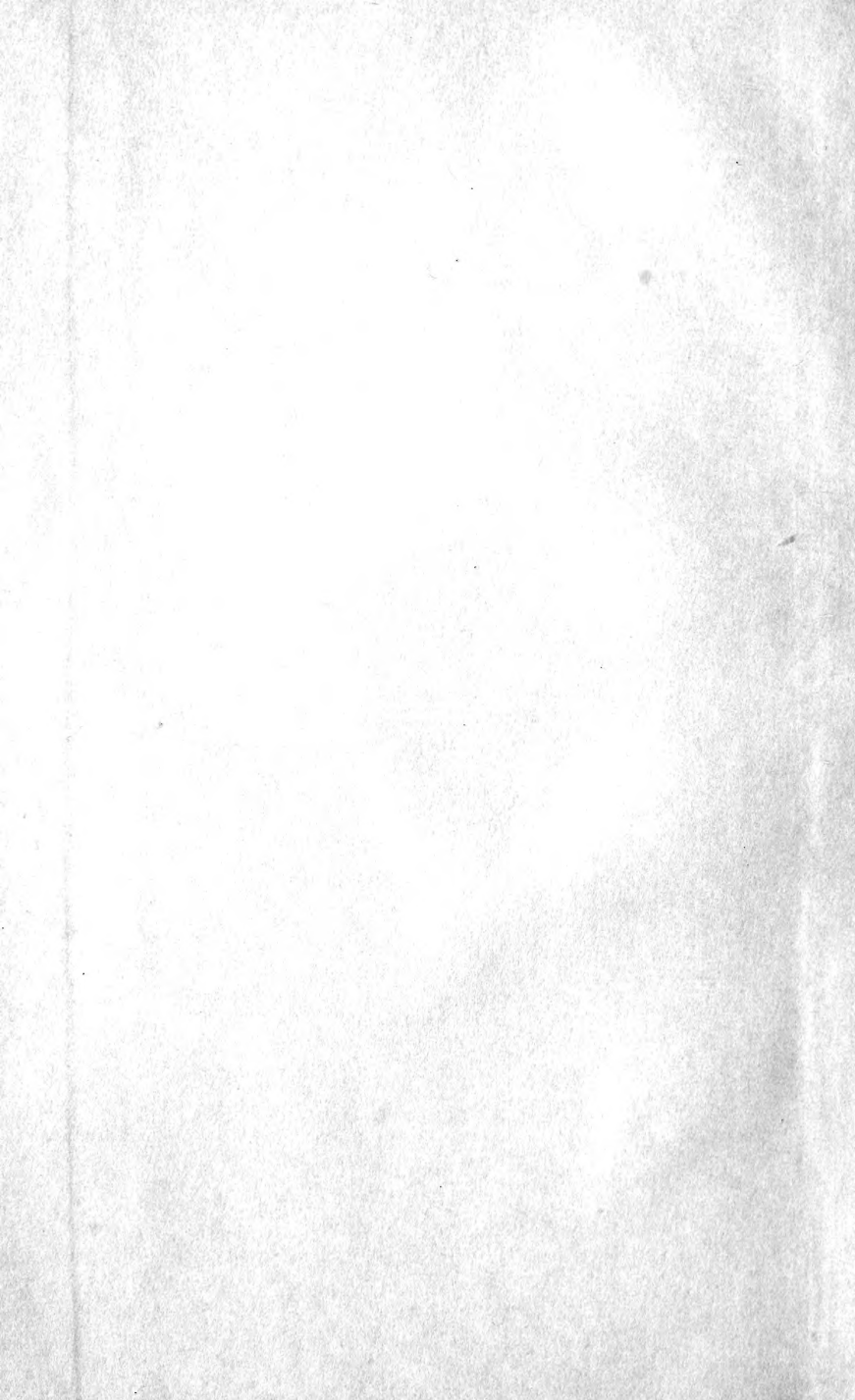


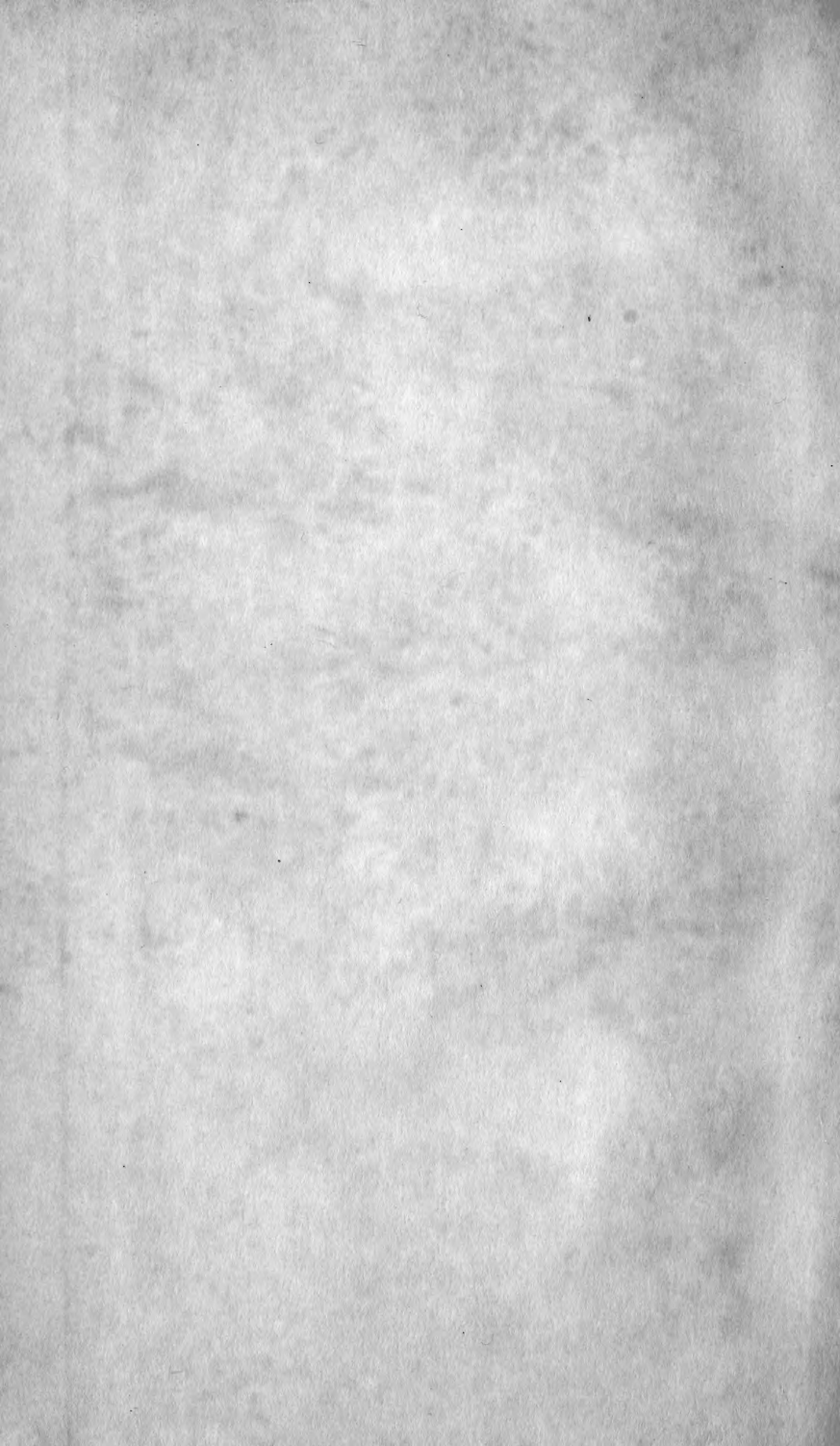
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WILD FAUNA OF THE EMPIRE

Volume IV.

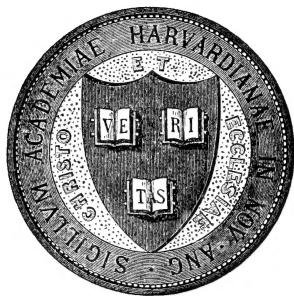
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THE SOCIETY FOR THE PRESERVATION OF THE WILD FAUNA OF THE EMPIRE



ORIGIN AND OBJECTS OF THE SOCIETY

THE destruction of wild animals throughout the British Empire, more especially in Africa, had become so appalling that in 1903 a small Association was formed for the purpose of collecting information as to the number of wild animals killed each year, the gradual disappearance of species, &c., and to take steps so far as possible to check this destruction. The objects of the Association are to create a sound public opinion on the subject at home and in our Dependencies, to further the formation of game reserves and sanctuaries, the selection of the most suitable places for these sanctuaries, and the enforcing of suitable game laws and regulations.

The principal officials in charge of the various sections of British Africa are impressed with the importance of immediate steps being taken for the preservation of African game, and have, without exception, consented to become Vice-Presidents or Honorary Members of the Society.

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 2 Temple Gardens, E.C.

EXTRACT FROM MESSAGE FROM THE HON. THEODORE ROOSEVELT, PRESIDENT OF THE UNITED STATES.

It is perfectly evident to any intelligent man that the people who are protesting against what they call 'the curse of the big game' do not know what they are talking about. We have just such people in abundance here in America, and I have for twenty-five years waged war upon them in connection with game protection.

I was particularly pleased to receive the journal. It is most interesting. I congratulate you upon the admirable work you are doing, and I wish you would extend to your colleagues my hearty sympathy with all that is being accomplished by the Society for the Preservation of the Wild Fauna of the Empire.

THEODORE ROOSEVELT.

EDITORIAL NOTE.

IN issuing the fourth volume of the Journal of the Society, we are glad to be able to announce one satisfactory result of the efforts we have made for the preservation of the fauna in Africa. It will be within the recollection of our members that we have approached successive Secretaries of State for the Colonies with a view to securing an adequate staff for Game Preservation in British East Africa, which has hitherto been limited to a single officer and an expenditure of £300 per annum. We are pleased to be able to announce that these representations have at length received attention, and that a sum of £2,300 has been included in the estimates for this Protectorate, where the need for it is perhaps greater than in any other.

The progress of the Protectorate may be measured by the increase of railway net receipts from £2,639 in 1904-5 to £76,150 in 1906-7. These figures indicate phenomenal extensions of 'white' development, and, if we are correctly informed, protection of the game is rendered correspondingly urgent.

It is a pleasure to many members of the Society to know that Lieut.-Col. J. H. Patterson, D.S.O., has accepted the appointment of Chief of this Department. Colonel Patterson, who is well known to many of our members, is, as we believe, admirably equipped for this post by his knowledge of the territory, as well as by his sympathy with animal life, energy, and tact.

We have repeatedly pointed out the need of a limit of 25 lbs. on the elephants' tusks permitted to be exported from British Protectorates. This limit, or a higher one, has been generally imposed, but was strongly resisted in Uganda, where it is asserted that the natives suffer from the depredations of elephants in their *shambas*. This, on the surface, seems reasonable, but we shall continue to point out that if cow and immature elephants are killed to protect the plantations, there is no reason to add the further inducement of a high profit on the sale of small ivory.

For the convenience of those who have not the important Blue Book on the Preservation of Wild Animals in Africa, issued in November 1906, we have included in this number some further extracts from it. For present purposes we need only refer to No. 232, relating to the trade in horns and skins in Somaliland

carried on at Aden, to which we had called attention. It might be gathered from this and other papers that our representations had resulted in arresting this mischievous traffic. We regret to hear from a correspondent that this is not the case. We can assure our members that the matter will not be lost sight of.

We desire to call special attention to the important article by Professor Austen on the connection of the tsetse-fly and big game. It deals with the allegation that the *Glossina palpalis* is dependent on the game, and with the inference that the latter must be destroyed. The article is of the highest scientific interest, and has, it is needless to say, a close bearing on the objects of this Society.

THE DEPENDENCE OR NON-DEPENDENCE OF TSETSE-FLIES UPON BIG GAME, WITH SPECIAL REFERENCE TO THE SPECIES OF TSETSE KNOWN AS *GLOSSINA PALPALS* AND SLEEPING SICKNESS.

By ERNEST E. AUSTEN, F.Z.S.

(Author of 'A Monograph of the Tsetse-flies,' etc.)

Whatever view the reader may hold upon the subject of this paper, no one can fail to agree with the recent pronouncement by a leading English scientific journal that sleeping sickness is to-day 'the most burning problem of European colonisation in Equatorial Africa.'¹ Not only has the dread disease, which has hitherto baffled all endeavours to find a certain cure on the part of the ablest experts in tropical medicine among several European nations, within the last seven years claimed many hundreds of thousands of victims among native races for whose welfare we in common with others have made ourselves responsible, but the rapid spread of the malady itself and its extension into fresh districts are already threatening the development of important commercial enterprises, which depend for their prosperity upon the regular supply of native labour. Serious as are the losses and impediments to settlement and progress due to tsetse-fly disease in domestic animals, these are as nothing when compared with the threatened depopulation of large tracts of the African continent. Furthermore, although it was at one time believed that white men were not liable to contract the disease, it has been proved by a number of sad examples that no European resident in an area infected by sleeping sickness can consider himself altogether safe.

While the accuracy of the foregoing statements must be generally admitted, it is equally true that, at the present time, the most serious menace to the continued existence of big game and game reserves in various parts of Africa is the idea, apparently held by many people, that to protect game is to preserve tsetse-flies, and so increase the risk of the spread of sleeping sickness; since, so far as is at present known, the minute living parasite that is the cause of the disease is carried from man to man solely by the bite of a particular species or kind of tsetse-fly, termed by naturalists *Glossina palpalis*. In other words, it is maintained that tsetse-flies subsist exclusively upon the blood of big game, and that if the latter were utterly destroyed tsetse-flies themselves

¹ *Nature*, November 14, 1907, p. 36.

would soon be numbered among the various forms of animal life that have become extinct within living memory. This belief found prominent expression in the columns of the public press on more than one occasion during 1907 and 1906. The attack of 1906 was dealt with by myself at the time, and subsequently in some remarks that I ventured to address to the Secretary of State for the Colonies, as a member of the deputation from our Society received by Lord Elgin at the Colonial Office on June 15 of that year.¹ In 1907 the attack was renewed by Mr. T. M. Hastings, who, in a letter headed 'Game Preservation and the Tsetse-Fly,' published in the *Spectator* of March 2, suggested that 'an experiment might very well be made of killing and driving away the game over a certain fly district and observing carefully whether it be followed by a disappearance of the fly—that is to say, the particular species which conveys the infection.' This letter was replied to in the same journal a fortnight later by Mr. E. N. Buxton, who pointed out that, in order that the experiment should be satisfactory, the area selected would have to be 'an extremely wide one.' Other letters followed, in one of which Mr. Hastings affirmed his belief that 'there is no doubt whatever now . . . that the particular species of tsetse which produces cattle sickness can be got rid of by getting rid of the game,' proceeding to remark that 'the question which remains to be solved is whether the other species [*Glossina palpalis*] is subject to the same law.'² More recently a much more detailed correspondence, initiated by a letter from Mr. R. L. Harger,³ of Blantyre, British Central Africa, has appeared in the *Field*, in which Mr. F. C. Selous and Sir Alfred Sharpe figured as protagonists. In all these letters the species of tsetse referred to was *Glossina morsitans*, the best-known disseminator of tsetse-fly disease in domestic animals, and the fly with which, owing to its quondam abundance in the valleys and along the tributaries of the Limpopo and the Zambesi, the innumerable records and statements on the subject of tsetse in the older books on South African sport and exploration are concerned. Mr. Harger, who has had many years' experience in the countries administered by the British South Africa Company, and whose sympathies are entirely on the side of the game, commenced his letter by stating that: 'There is great likelihood of a vast deal of game being destroyed in North-Eastern and North-Western Rhodesia owing to the presence of tsetse-fly.' He then endeavoured to show that the undoubted increase and extension of *Glossina morsitans* in North-Eastern Rhodesia of late years is in

¹ Vide 'Journal of the Society for the Preservation of the Wild Fauna of the Empire,' vol. iii. 1907, pp. 43-44, and 24-26.

² The *Spectator*, April 6, 1907, p. 31. It is perhaps permissible to observe that, to a scientific mind conversant with the facts, the use of the word 'law' in this connection would seem unwarranted.

³ The *Field*, September 28, 1907, p. 582.

no way due to game, but has been caused by 'the opening up of the country,' the making of roads and the movement along them of gangs of natives, and the 'passage of thousands of head of cattle . . . from German East Africa to Southern Rhodesia.' Mr. Harger stated that he had 'good reason to believe' that the 'future policy of the administrations of both North-Eastern and North-Western Rhodesia' is to destroy the game 'in view of forwarding the cattle-raising industry,' under the impression that 'the destruction of game will cause the disappearance of the tsetse.' Mr. Harger's letter elicited a response from Mr. Selous, who remarked that the previous writer's experience of tsetse-fly in Northern Rhodesia appeared to be 'entirely opposed to the well-known historical facts concerning these insects in the countries to the south of the Zambesi.' Mr. Selous, whose unrivalled knowledge of big game in the countries bordering on the Limpopo, Zambesi, and Chobe rivers no one will wish to dispute, is acquainted with 'no single instance of tsetse-flies extending their range along trade routes and waggon roads which intersected the well-defined areas where they were known to be present.' On the other hand, he stoutly maintains that the history of Africa south of the Zambesi has proved beyond all possibility of question that, *in this part of the continent, at any rate, the existence of Glossina morsitans is absolutely bound up with that of the buffalo*; and that, once buffaloes have been exterminated in or driven from any locality in which they and this species of tsetse formerly abounded, the fly has not long survived them, and has become absolutely extinct in the course of a few years. Mr. Selous's experience has been that other species of game, even though they continued to be abundant in the very places vacated by the buffaloes, do not suffice for the physical needs of *Glossina morsitans*, and he therefore recommends that, if an experiment of the kind suggested by Mr. Hastings be tried, it should be limited to driving away *Bubalus caffer*. His conclusion is that 'To exterminate game of all kinds in a country in order to get rid of tsetse-fly would not only be an abominable crime, but an absolutely unnecessary one; but in any country to the south of the Zambesi and north of the 28th parallel of south latitude where the elevation is less than 3,000 ft. above sea-level, you cannot have buffaloes without having tsetse-flies as well.'¹

The gauntlet thrown down by Mr. Selous was taken up by Sir Alfred Sharpe,² whose experience has been entirely north of the Zambesi. Sir Alfred stated that he was for a time content to accept the view, 'formerly very generally held,' that fly was 'dependent on wild game for its existence'; but that 'after some years of very careful observation of tsetse and their habits throughout the British Central Africa Protectorate, in parts of

¹ The *Field*, October 5, 1907, p. 620.

² *Ibid.* October 19, 1907, p. 707.

North-Eastern Rhodesia, and in German and Portuguese East Africa,' he has 'come to the conclusion that there is no evidence worth serious consideration to show that tsetse depend upon or are distributed by any description of wild game.' As regards British Central Africa, Sir Alfred Sharpe gave instances to prove that facts in this country are not in accordance with Mr. Selous's theory that 'tsetse depend on buffalo for their existence, and that if the buffalo are killed or dispersed fly will disappear.' The most important statement in this letter, however, is one to which all those who are competent to express an opinion upon the subject will give an unqualified assent. 'The conclusions I have arrived at,' wrote Sir Alfred, 'are that tsetse require a definite description of country, and that they are never found outside the limits of the ground which suits their wants—game or no game, buffalo or no buffalo.' Other lengthy letters from Mr. Selous and Sir Alfred Sharpe subsequently appeared,¹ but in the main the correspondence resolved itself into a discussion upon the old theme of the alleged dependence of the species of tsetse-fly known as *Glossina morsitans* upon the buffalo.

It is hoped that the foregoing *résumé* of the recent newspaper campaign will enable those who may not have closely followed the arguments to understand the present position of the tsetse and big-game question. The vital points at issue will now be dealt with in the light of the most recent knowledge on the subject.

THE FOOD OF TSETSE-FLIES.

In a letter written in September 1901 by Mr. F. J. Jackson, C.B. (now Commissioner of the East Africa Protectorate), to the Marquess of Lansdowne (at that time His Majesty's Principal Secretary of State for Foreign Affairs), the opinion was expressed that 'the tsetse is, like the mosquito, only a blood-sucker by predilection.' As was pointed out by the author some time ago in another place, the meaning of this phrase would appear to be that, in default of blood, which they prefer, tsetse-flies can continue to subsist on the juices of plants.² Mr. Jackson's view now seems to have been adopted by Sir Alfred Sharpe, who recently asserted his belief that, although 'Tsetse . . . when it has the opportunity sucks the blood of all such animals as it can get at in tracts of country in which it exists, . . . blood is an exceptional diet (as in the case of the mosquito).'³ For the sake of big game and the peace of mind of all who have the welfare of the wild fauna of Tropical Africa at heart, it is much to be wished that this pleasing opinion as to the natural food of tsetse-flies could be substantiated. It is, however, impossible, and indeed worse than useless, to

¹ The *Field*, October 26, November 2 and 9, 1907.

² *Vide* Austen, *Monograph of the Tsetse-flies* (1903), p. 297.

³ The *Field*, November 2, 1907, p. 793.

ignore facts, and it must be regretfully admitted that not a particle of evidence exists to show that any species of the genus *Glossina* can support itself upon diet of a vegetarian character. For my own part, at any rate, after a fairly close study of the subject during the past six years, I am convinced that no species of tsetse can continue to exist without blood of some kind; but, as will shortly be shown, *it does not at all follow that the blood must necessarily be mammalian*. As regards the need for blood in some form, however, abundant proof is to be found in the records of recent experiments to test the capacity of tsetse-flies to transmit the parasite of sleeping sickness. Thus Dr. J. L. Todd, writing of captive specimens of *Glossina palpalis* in the Congo Free State, used for experimental purposes by the expedition of the Liverpool School of Tropical Medicine to the Congo, 1903-5, says: 'If they were left without an opportunity to feed [on blood] for much more than 24 hours they died very quickly, about 91 per cent. in 37 hours. Neither sex seemed particularly resistant.'¹ Again, Dr. P. H. Ross, after experimenting in British East Africa with other species of tsetse-flies (*Glossina fusca*, *G. longipennis*, and *G. pallidipes*), which were fed on monkeys, states that 'It was found that if the period of starvation were prolonged beyond four days very few flies survived.'² In Uganda members of the Sleeping Sickness Commission state with regard to *Glossina palpalis* that they were 'never able to obtain any definite proof that it fed on anything but blood.'³

It is true that many species of Diptera (two-winged flies), belonging to groups notorious for their blood-sucking propensities, may exist in the adult state and even reproduce their kind without tasting blood. Not to mention the mosquitoes, among which a number of instances in support of this statement might be found, illustrations are provided by the Tabanidæ (horse-flies, clegs, serut-flies, &c.), two species of which, it may be remarked, have recently been shown by the brothers Sargent to be capable of conveying a trypanosomiasis (*El Debab*), which decimates dromedaries in Algeria. According to Hine,⁴ the females of some American Tabanidæ take other food than blood, and the author in question expresses the belief that it would not be 'overstating the facts to say that specimens of this sex may pass the period of adult life without taking blood at all.' Hine states that he has often seen both sexes sipping dew from leaves, and has observed a number of species of *Chrysops* and *Tabanus*, belonging to both sexes, feeding on the honeydew produced by aphides. These state-

¹ *Annals of Tropical Medicine and Parasitology*, vol. i. No. I. (February 1, 1907), p. 70.

² 'Reports of the Sleeping Sickness Commission of the Royal Society,' No. VIII. (February 1907), p. 81.

³ Minchin, Gray, and Tulloch, *ibid.* p. 131.

⁴ U.S. Department of Agriculture, Miscellaneous Papers, 1906, p. 25.

ments cannot, however, be regarded as in any way supporting the idea that tsetse-flies could continue to exist if the supply of blood in some form or other were absolutely cut off. Both mosquitoes and horse-flies belong to families very much more primitive and less specialised than the Muscidae, of which the genus *Glossina* is in many respects the most specialised representative. It is not unreasonable to regard the specialisation in this case as being exhibited in the *diet* as well as in the bodily structure and remarkable mode of reproduction, which makes it in the highest degree unlikely that plant-juices can supply tsetse-flies with all that is necessary for the support of themselves and their offspring. Another indication of specialisation, which, however, the tsetse-flies exhibit in common with other blood-sucking Muscidae, is seen in the fact that *both sexes* suck blood, whereas in the case of all other phlebotomic Diptera, with the possible exception of *Phlebotomus* and the still more specialised Hippoboscidae (forest-flies, &c.), the habit is confined to the females.

THE ALLEGED DEPENDENCE OF TSETSE-FLIES UPON BIG GAME.

Having thus made candid admission of the fact that blood is indispensable to tsetse-flies, we will now see to what extent recent observations support the oft-repeated assertion or assumption that the animals included in the comprehensive designation *game* are necessarily the source of supply. Before entering upon this question, however, it seems advisable to say a few words by way of personal explanation. Prior to the year 1903, when the author's 'Monograph of the Tsetse-flies' was published, by far the greater portion of the recorded observations upon the subject of the relations between tsetse and big game referred solely to *Glossina morsitans*, and to Africa south of the Zambesi, where, as will be shown later in speaking of tsetse and buffaloes, conditions at the time at which many of the observations were made were in some respects of a special character. Having then little else to go upon when writing of the habits of tsetse-flies in general, and being perhaps unduly influenced by a suggestion made fifty years ago by Livingstone,¹ I was led to make what has since proved to be a far too sweeping generalisation as to the dependence of tsetse-flies upon big game.² The statement in question is the more to be regretted since it was naturally used by Mr. Hastings as an argument in support of his suggestion, referred to above, for the experimental abolition of game within a selected fly district. But, just as the discovery that the blood-parasites that produce malarial fever in man are disseminated by the bites of certain mosquitoes

¹ David Livingstone, *Missionary Travels and Researches in South Africa* (London: John Murray, 1857), p. 83.

² *Vide* Austen, *Monograph of the Tsetse-flies* (London: Printed by Order of the Trustees of the British Museum, 1903), p. 12.

has led to the concentration of an enormous amount of attention upon a group of insects about whose habits and mode of life comparatively little was previously known, the demonstration that the organism which is the cause of sleeping sickness is spread by a particular species of tsetse-fly has resulted in the accumulation within the last five years, by investigators in various parts of Africa, of a number of fresh facts bearing upon the bionomics of the genus *Glossina*. At the present time, therefore, we are able to form a far truer conception of the relation between the various species of tsetse and big game than was possible in 1903. Let us take the most important species, *Glossina palpalis*, first. That this tsetse-fly is dependent upon big game for its subsistence is disproved by the experience of Professor Minchin and Messrs. Gray and Tulloch, R.A.M.C.,¹ in Kimmi, a small uninhabited island of the Sesse group, in Lake Victoria, Uganda. It is true that we are told that the island is 'a regular feeding ground for hippopotami,'² but the ordinary game animals are entirely absent. Crocodiles, however, are 'very numerous,' and 'cormorants, other diving birds, and weaver birds are very plentiful.' 'The whole island swarms with tsetse-fly (*G. palpalis*).' This species of tsetse is particularly closely associated with water, which is not invariably the case with regard to certain others, such as *Glossina morsitans* and *G. fusca*. As a rule *G. palpalis* is not met with more than 50 to 100 yards from the water's edge; according to Dr. A. D. P. Hodges, in Unyoro and the portion of the Nile Valley lying within the Uganda Protectorate, 'the outside limit may be given as 300 yards.'³ On Lake Victoria Messrs. Minchin, Gray, and Tulloch state that the fly haunts the lake-shore in a remarkable way, and that, since there is nothing in its breeding-habits to account for this, the food-supply is the probable attraction. These members of the Sleeping Sickness Commission write that the 'vast numbers of cormorants and other fish-eating birds' found 'along the shores of the lake and on all the small islands might furnish one constant and important source of food.' In the laboratory it was observed that the fly 'fed very rapidly on captive

¹ 'Reports of the Sleeping Sickness Commission of the Royal Society,' No. VIII. (February 1907), p. 128.

² As to *Glossina palpalis* and hippopotami, a recent observation by Dr. A. D. P. Hodges, Medical Officer, Uganda Protectorate, is of interest. According to Dr. Hodges, the Bachopi people (in Western Uganda, in the vicinity of Fajao) 'say that *Glossina palpalis* "follows the hippopotami," but it was found in many places where these animals seldom or never come, and was absent from others where they abound' (*Ibid.* p. 91).

³ *Ibid.* p. 90. Of course there are exceptions to this rule: Dr. J. L. Todd, writing of *G. palpalis* in the Congo Free State, remarks that the fly has extensive powers of flight, and is occasionally found as much as half a mile from water. Nevertheless it appears to be 'very local in its habits. As has often been observed, not a single fly may be seen at 100 yards from a river, although its banks swarm with them' (*Annals of Tropical Medicine and Parasitology*, vol. i. No. 1 (February 1, 1907), p. 63).

fowls, creeping under their wings to bite the poorly protected parts of the skin.' The writers in question further remark that: 'A second possible source of food supply is furnished by the aquatic animals of the lake shore, such as the hippopotamus, the otter, the crocodile, and the python'; and they state that they 'have definite evidence that the fly feeds on the hippopotamus and on the crocodile.' It was also found that 'flies in captivity sucked the blood of lizards, chameleons, and snakes very freely.'¹ The statement that the crocodile contributes to the support of *Glossina palpalis* has within the last few months been confirmed by Professor Koch, who, as the result of an eighteen months' sojourn on another desolate island in the Sesse group, is reported to have declared that: 'The blood of crocodiles forms the chief nourishment of the *Glossina*, which sucks the blood between the plates of the animal's hide.'² Further evidence as to this indirect connection between *Crocodilus niloticus* and sleeping sickness will doubtless be forthcoming in Professor Koch's detailed report on his recent investigations, which has not yet been published. In the meantime information has been received from a private source to the effect that, while on Lake Victoria, the distinguished German investigator examined the contents of the stomachs of large numbers of wild-caught *Glossina palpalis*, with the result that he found that *in no less than 90 per cent. of the cases they consisted of crocodile blood*. It remains to be proved how far this finding holds good for other parts of Africa in which the sleeping sickness tsetse-fly occurs; but at least it may be said that there is nothing in the present-day distribution of the crocodile to prevent it being generally true, while owing to the specially close association of *Glossina palpalis* with water and the well-known habit of crocodiles of basking on land for hours at a time, these reptiles would seem eminently adapted by nature to provide sustenance for the fly.

Be this as it may, the result of all observations hitherto made is to show that in other parts of Africa big game is no more chargeable with being the chief support of *Glossina palpalis* than on the shores of Lake Victoria and its islands. In 1903 it was discovered by Mr. W. Y. Wyndham that this species of tsetse occurs all round Lake Albert, in Uganda; yet, writing from Wadelai, on November 2, 1903, to Dr. Nabarro at Entebbe, Mr. Wyndham remarked: 'The fly cannot depend for its existence upon game, as in most of the places in which I found it there was none or next to none.' Again, Dr. J. L. Todd, a member of the Expedition of the Liverpool School of Tropical Medicine to the Congo, 1903-5, writing of the results of nearly two years' experience in the Congo Free State, after observing that on one occasion at Lokandu, on the Upper Congo, two or three *Glossina palpalis* followed two

¹ Minchin, Gray, and Tulloch, *loc. cit.* pp. 130, 131.

² The *Times*, November 4, 1907.

tame antelopes, and that 'in the Lower Congo the belief that *G. palpalis* follows pigs is very common'—makes the following highly important statement (the italics are my own): 'Apart from these observations *no information was gathered on the Congo to support the idea that tsetse-flies are dependent on large game.* On the contrary, many *G. palpalis* were seen in localities where there was exceedingly little game of any sort.'¹ Dr. Todd remarks that *Glossina palpalis* showed no preference for any particular kind of blood, and that on one occasion specimens of the fly 'were persuaded to suck blood from a frog.'² In Sierra Leone I have found this species of tsetse abundant in a place where there was certainly no game of any kind, though there was a herd of cattle in the immediate vicinity.

Examples to the same effect as regards other tsetse-flies might easily be multiplied, but two or three instances must suffice. Mr. A. H. Neumann, writing of the Athi River (British East Africa) above its junction with the Tsavo, in May 1895, notes the remarkable scarcity of game, 'even along the banks of the river,' and adds: 'Here are great stretches of uninhabited bush country with a perennial river running through it, and hardly any animals, though plenty of birds and of "fly" (tsetse).'³ In 1903 *Glossina tachinoides* (a species closely allied to *G. palpalis*, and common on the Benue River in Northern Nigeria) was met with by Captain R. Markham Carter, I.M.S., on the Tiban River, in the Aden Hinterland.⁴ Describing this interesting discovery in the *British Medical Journal* of November 17, 1906, Captain Carter said: 'The Arabian *Glossina tachinoides* does not depend for its existence on big game, for, excepting gazelle, nothing else frequents the belts of bush which it haunts.' We may conclude this section of our subject with the recent testimony of a German writer, Dr. L. Sander, with reference to *Glossina morsitans*, *G. pallidipes*, and *G. fusca* in German East Africa. The author in question states that, in all the districts between Tanga and Kilima 'Njaro investigated by him for the purpose of studying the supposed connection between tsetse-flies and big game, everyone, Europeans and natives alike, agreed in declaring that the game had diminished in numbers to an extraordinary degree, but that tsetse appeared each year in ever greater multitudes and in localities previously free from them.'⁵

¹ *Annals of Tropical Medicine and Parasitology*, vol. i. No. 1 (February 1, 1907), p. 62.

² *Ibid.* p. 70.

³ A. H. Neumann, *Elephant-Hunting in East Equatorial Africa* (London: Rowland Ward, Limited, 1898), pp. 141-142. The species of tsetse in this case was in all probability *Glossina pallidipes*.

⁴ Since the south-west corner of Arabia is zoo-geographically a part of the Ethiopian Region, there is nothing remarkable in a tsetse-fly being found there, although the genus *Glossina* was previously supposed to be confined to the African continent and the islands in the Bight of Biafra.

⁵ L. Sander, *Die Tsetsen* (Leipzig, 1905), p. 46.

THE SUPPOSED SPECIAL DEPENDENCE OF THE SPECIES OF TSETSE
KNOWN AS *Glossina morsitans* UPON THE BUFFALO.

Prior to the year 1903, when it was discovered by members of the Sleeping Sickness Commission in Uganda that the parasite of the disease that they were investigating is disseminated by *Glossina palpalis*, the best-known species of tsetse was *Glossina morsitans*, the only member of its genus found in Southern Africa, where it was formerly abundant in suitable localities between the Zambesi and St. Lucia Lake. That this tsetse is closely associated with or dependent upon the buffalo has been frequently asserted and reasserted during the last forty years—that is, ever since the statement was first definitely made by Chapman in 1868.¹ It would seem that this belief is due partly to the fact, which is clearly established by Mr. Selous's letters alluded to above, that in Africa south of the Zambesi buffaloes and *G. morsitans* at one time abounded in precisely the same spots, and partly to the old native idea, adopted by many of the earlier big-game hunters, that the fly breeds in buffalo dung. The true life-history of the tsetse-flies, however, was elucidated in 1895 by Colonel David Bruce in the course of his epoch-making researches into the cause of tsetse-fly disease of domestic animals, and we now know that no species of tsetse breeds in the droppings of the buffalo or of any other animal.² That the buffalo cannot be held to be specially responsible for the existence of tsetse in the East Africa Protectorate was satisfactorily established in 1901 by a series of letters from well-qualified observers forwarded to the Foreign Office, and elicited by the assertion that to protect this animal would be equivalent to protecting tsetse as well.³ For the buffalo in British Central Africa a similar plea of 'Not guilty' was, as has already been mentioned, successfully urged by Sir Alfred Sharpe in the recent *Field* correspondence. In many parts of North-Western

¹ James Chapman, *Travels in the Interior of South Africa* (Two vols. London: Bell and Daldy; Edward Stanford. 1868). Vol. i. p. 177.

² The female tsetse does not lay eggs, as do the majority of other flies, but produces living maggots—a single maggot at each birth; this maggot is retained within the body of its parent, and nourished by the secretion of special glands, until it is full-grown; on being extruded it crawls away and buries itself in the ground, where it at once turns into a chrysalis, from which the perfect fly makes its appearance in due course. In 1906 Dr. A. G. Bagshawe discovered the pupæ (chrysalides) of *Glossina palpalis* in loose crumbling soil around the roots of bananas on the shore of Lake Albert Edward (*Nature*, October 25, 1906, p. 636). Mr. R. L. Harger, in the course of the letter referred to above, states that he has often watched tsetse (*G. morsitans*) deposit 'eggs' (i.e. maggots) in the damp earth thrown up by the digging of a trench round his tent.

³ See Austen, *Monograph of the Tsetse-flies*, Chapter VII. Appendix C, pp. 290-297. 'Copies of Letters on the subject of the supposed connection between the Tsetse and the Buffalo (*Bubalus caffer*, Sparrman): transmitted by the Foreign Office to the British Museum (Natural History).'

as of North-Eastern Rhodesia *Glossina morsitans* is abundant at the present time, and as regards conditions in the Kasempa District of the former territory, I have recently been favoured with some important observations by Mr. E. A. Copeman, District Commissioner and Magistrate. 'It has frequently been observed,' writes Mr. Copeman, 'that where "fly" has been found to be more than usually numerous, this by no means implies that game will be numerous in the same locality, and *vice versa*. In the south-west of the District and west of the Kabompo River, where there are several herds of buffalo, no "fly" was to be found, whereas to the east of the river at the same latitude it is found over a large area in the greater part of which there are no buffalo. It has been proved that tsetse from time to time invade new areas and also vacate old ones, but there is nothing to show that this has been consequent on a similar movement on the part of the game.'

In the tsetse belts along the southern bank of the Zambesi and Chobe Rivers, however, and further to the south, conditions are different, or rather were so at the period of which Mr. Selous writes. 'It took many years,' we are told, 'before the tsetse had completely died out, but to-day there are neither buffaloes nor tsetse-flies in a part of the country where less than five-and-thirty years ago both literally swarmed. If there is no connection between the buffalo and the tsetse, why is it that, not in one district alone, but everywhere in Africa south of the Zambesi, in countries as far apart as Delagoa Bay and the district of the Victoria Falls, as soon as buffaloes have been completely extirpated, tsetse-flies have at once diminished very rapidly in numbers, and sooner or later have become completely extinct?'¹ Whether *Glossina morsitans* is at the present time absolutely non-existent in all of the places referred to by Mr. Selous could only be determined by means of a special investigation on the spot. It may, however, be mentioned that while this paper was being written the British Museum received from Major E. J. Lugard, D.S.O., five specimens of the fly taken by him on the south bank of the Chobe River, between a spot opposite Linyanti and the Sunta outlet, in August 1899. Whether the insect was encountered in any great force, or is still to be found in the same place, I am unable to state; but the locality and date of Major Lugard's specimens at any rate prove that on the Chobe River, where in the early 'seventies of last century buffaloes existed 'in prodigious numbers . . . all the year round,' the fly had not become 'completely extinct' so soon after the disappearance of the animals as Mr. Selous believes. Possibly, however, this is an exceptional case, and in any event the general truth of statements backed by the weight of Mr. Selous's unimpeachable authority must be admitted.

¹ F. C. Selous, the *Field*, November 9, 1907, p. 835.

We have now to see whether Mr. Selous's very natural question admits of a satisfactory reply. In the opinion of the present writer it would seem that the solution of the conundrum is not far to seek. Mr. Selous himself admits that when he first made their acquaintance, some five-and-thirty years ago, buffaloes far outnumbered all other game in the places of which he writes. The excessive abundance of these slow-moving, water-loving animals, which passed most of their time in precisely the spots that were otherwise adapted to the physical needs of the tsetse, provided so ample a food-supply as to lead to the development of the enormous numbers of the fly testified to by Mr. Selous. It is reasonable to suppose that, prior to the acquisition of firearms by the natives in the closing decades of last century, conditions as regards the big game in the countries between the Zambesi and the Limpopo had undergone little change since the buffalo first made its appearance in South Africa. Having, therefore, for countless ages been supported by buffalo blood, the South African hosts of *Glossina morsitans* could not readily adapt themselves to that of other animals, and so dwindled in numbers or died out when the buffaloes themselves disappeared. After all, now that the rinderpest and the advance of civilisation have completed the work of destruction commenced by the natives' guns, the question is chiefly one of historic interest, since there is no reason to imagine that the retention of all the game reserves in Africa will ever lead to the increase of the buffalo to anything approaching its former numbers.

NO EVIDENCE AT PRESENT THAT ANY SPECIES OF TSETSE OTHER THAN *Glossina palpalis* CAN CONVEY THE PARASITE OF SLEEPING SICKNESS.

The possible danger of allowing natives with the parasite of sleeping sickness (*Trypanosoma gambiense*) in their blood to enter any district at present free from the disease but infested by any species of tsetse-fly, even though *Glossina palpalis* itself be absent, has been repeatedly urged by the present writer. As an illustration it may be mentioned that the authorities of North-Eastern Rhodesia, where, as has already been stated, *Glossina morsitans* is abundant, have recently become seriously alarmed lest the territories under their control should be invaded by the malady. *Glossina morsitans* is also widely distributed in North-Western Rhodesia, while just beyond the border, in the Katanga District of the Congo Free State, sleeping sickness is known to be endemic. Here, then, if *Glossina morsitans* be capable of conveying the disease, there is a 'port of entry' ready to hand. It is, therefore, from the point of view of the present paper, not without importance to state that as yet there is no evidence to show that any species of tsetse other than *Glossina palpalis* can act as a carrier.

A friend of the writer has lately been informed by Professor Koch that he believes *Glossina palpalis* to be *the only transmitter*. As one of the arguments in support of this view the Professor made the following statements. In the portion of German East Africa on the western shore of Lake Victoria, and to the south of Uganda, *Glossina morsitans* is abundant, but there are no *G. palpalis*. In spite of the fact that natives from the infected areas further to the north have been coming into this district for some years past, the disease has never spread, as it might be expected to have done were it transmissible by *Glossina morsitans*. It is devoutly to be hoped that Professor Koch's belief will prove well founded. In the meantime, however, the question cannot be regarded as settled, and it is much to be wished that the Governments of the various Colonies and Protectorates concerned will, without delay, make the necessary arrangements for deciding this all-important matter once for all, by means of an exhaustive series of properly controlled experiments.

THE RÔLE OF *Glossina palpalis* IN CONNECTION WITH SLEEPING SICKNESS.

Lest it should be imagined by the lay reader anxious for the preservation of the wild fauna of Africa that everything in connection with the part played by *Glossina palpalis* in the transmission of sleeping sickness is now understood, it is perhaps as well to explain that at the present time this is far from being the case. Although this tsetse-fly is as yet the only living agent that has been proved by experiment to convey the parasite that is the cause of the disease, and although (as has been shown by the members of the Sleeping Sickness Commission of the Royal Society, in Uganda, and by those of the expedition of the Liverpool School of Tropical Medicine to the Congo, 1903-5, in the Congo Free State) the occurrence of sleeping sickness and *G. palpalis* correspond in such a way that the disease is never found epidemic or endemic in any locality in which this species of tsetse is not present, in reading accounts of transmission experiments it is impossible not to be struck with the fact that very large numbers of flies are usually requisite in order to produce a successful result. Thus it has recently been stated by the late Dr. J. E. Dutton and by Drs. J. L. Todd and J. W. B. Hannington, of the Liverpool School of Tropical Medicine, that: 'The experiments of all observers show that it is frequently necessary to feed hundreds, almost thousands, of flies on a susceptible animal before it becomes infected.'¹ The result of all experiments hitherto performed tends to the conclusion that *Glossina palpalis* is a mechanical carrier of

¹ *Annals of Tropical Medicine and Parasitology*, vol. i. No. 2 (June 15, 1907), p. 212.

sleeping sickness; that is to say that if, after feeding upon a man whose blood contains the parasites, the fly, after an interval of some 48 hours or less, bites a healthy individual, some of the parasites previously taken up by the insect may escape from its proboscis in an unchanged condition and so convey the disease. In view of the 'rapid spread of sleeping sickness of recent years,' and the fact that 'large percentages of populations, whose vocation does not keep them constantly on the water, . . . become infected . . . in places where tsetse-flies are far from plentiful,' the Liverpool writers consider that: 'It seems certain that such a mechanical transmission cannot be the only way in which *Trypanosoma gambiense* is transmitted from man to man.' The conclusion arrived at by the authors in question is 'either that something is wrong in the way in which *Glossina palpalis* has been used in these experiments, or that *Trypanosoma gambiense* can be conveyed by some other means than by it.'¹ The parasite of sleeping sickness has not yet been found to undergo any developmental cycle in *G. palpalis* analogous to the reproduction of malaria parasites in the bodies of certain mosquitoes. On this account it has recently been suggested by Professor Minchin that it may after all not be necessary for an infected tsetse-fly actually to bite a man or domestic animal in order to convey one or other form of trypanosome infection; but that the parasites in the fly's intestine may, after undergoing developmental changes which are at present undiscovered, pass out with the insect's dejections, and so contaminate the food or drink of a subsequent vertebrate host.² In India and other parts of the East, as also in Mauritius, horses, cattle, and other animals suffer from *surra*, which is caused by a parasite closely akin to those that produce tsetse-fly disease of animals, or *nagana*, and sleeping sickness. The flies that have been found to disseminate this malady in the Philippine Islands and Mauritius belong to the genus *Stomoxys*, which is nearly allied to *Glossina*. In the former locality, however, it was shown experimentally, some four years ago, that sore-mouthed horses are liable to contract the disease when fed on fodder contaminated with *surra* blood and discharges from infected animals.³

CONCLUDING REMARKS.

It is well known to all who have had practical experience of *Glossina palpalis* that, in many localities, human blood forms no inconsiderable part of the diet of this species of tsetse. For the

¹ *Annals of Tropical Medicine and Parasitology*, vol. i. No. 2 (June 15, 1907), p. 213.

² E. A. Minchin, 'Reports of the Sleeping Sickness Commission of the Royal Society,' No. VIII., February 1907, pp. 141-142.

³ See W. E. Musgrave, 'Preliminary Report on Trypanosomiasis (*Surra*) in Horses in the Philippine Islands' (*Boston Medical and Surgical Journal*, June 25, 1903).

purpose of the present paper, however, it is unnecessary to do more than place this important fact on record, since it is hoped that what has been stated in the foregoing pages will suffice to prove that, even though an edict were to go forth to-morrow for the destruction of every buffalo, antelope, and zebra in Africa between Cape Verde and St. Lucia Lake, there are no reasonable grounds for supposing that tsetse-flies would cease to exist. In matters of sanitation, as in other affairs, partial measures are notoriously ineffective, and those who are clamouring for the abolition of big game and game reserves, on the plea that by their retention we are retaining tsetse-flies and the contingent perils, will find their proposals, even if adopted, of little avail, unless in their proscription they can contrive to include the birds, crocodiles, lizards, snakes, and practically every form of vertebrate life.

THE PRESERVATION OF BIG GAME.

By Sir HENRY SETON-KARR, C.M.G.

It will doubtless be a satisfaction to the members of the Society for the Preservation of the Wild Fauna of the Empire and other lovers of wild natural life if the Blue-book recently issued on this subject succeeds in attracting some public attention. We of the Society attach material, as well as sentimental, importance to the reasonable protection and preservation of the wild fauna—particularly the larger big game—in all British possessions. They not only add to the interest and attraction of our outlying portions of the Empire for sportsmen, naturalists, and travellers, but they also contribute to the material wealth and revenue thereof. The fauna of East Africa, for example, are an asset of large pecuniary value. The direct revenue derived from licences, &c., in British East Africa alone now amounts to between £8,000 and £10,000 a year, while the indirect annual revenue from the visits of sportsmen to that British possession has been estimated at over £20,000. These are figures—particularly in a young and sparsely populated portion of the Empire—that are not to be despised. Other examples of the kind could be given did space permit.

Those who are specially interested, from knowledge and experience, in this question have been called 'penitent butchers.' We are—shall I say wrongly and ignorantly?—thought to be men who, having in earlier days taken their fill of big-game slaughter and the delights of the chase in wild, outlying parts of the earth, now, being smitten with remorse, and having reached a less strenuous term of life, think to condone our earlier bloodthirstiness by advocating the preservation of what we formerly chased and killed. As a matter of fact, nothing can be more misleading as to our real feelings and intentions, no greater perversion of the real truth can be presented than such a statement. Your true sportsman is always a real lover of nature. He kills, it is true, but only in sweet reasonableness and moderation, for food if necessary, but mainly for trophies. Wholesale and unnecessary slaughter is abhorrent to him; and he always has an eye to the preservation of the stock, and so leaves severely alone all immature, and particularly all female of-their-kind-producing wild animals, except, of course, of the carnivora. I am confident that British sportsmen, as a class, have done nothing in any wild country to reduce or wipe out any kind of wild big game. Their so-called depredations—and the term is a misnomer—have been more than

compensated for by the natural reproduction and increase of the wild game.

Possibly all this is freely admitted by those who have thought on the matter at all. But it is as well to clear the ground and to know who are the real sinners, before touching on possible remedies. In case the term 'British sportsmen' should be too wide, I hasten to state two possible exceptions. Amateur ivory-hunters and certain sportsmen-naturalists in search of specimens are not altogether—in every case—clear of guilt. The former have, in some instances, been tempted to kill more than a fair proportion of elephants in Central Africa for the value of the ivory; and in reference to sportsmen-naturalists I have in my mind the recorded slaughter of the author of 'With Flashlight and Rifle,' who, in the desire for zoological specimens, committed greater depredations on African big game than the reasonable humane sportsman can approve of. But the hero in this case was not, as a matter of fact, British. The real depredators, however, in all wild countries have been natives and settlers. It is a curious fact that the men who, one would think, are, or should be, mainly interested in game preservation, the men who are indigenous to a country or have gone there to settle, and to whom the maintenance of its natural wealth of wild animal life for sport, for food, for revenue and gain is all-important—these are the very men who have invariably been most apt to diminish or destroy it. I have almost laboured to try and make this point clear, so that we may advocate remedies on right lines. A correct diagnosis of the disease precedes its cure.

I have known Western America for the past thirty years. First, in the days when big game of all kinds were plentiful, when no measures for their protection were even thought of, and when everyone killed according to his own sweet will. Then, again, I have known it since the buffalo have been wiped out, and since antelope, deer, and wapiti have been either exterminated in large stretches of country or driven therefrom into the wildest and most inaccessible portions of the Rockies. Protective legislation there is now in plenty in the Western States; but it came too late for the buffalo, and hardly in time—let us say only just in time—for the deer and the wapiti. The men who wiped out the buffalo and killed deer, antelope, and wapiti in thousands were partly the native Red Indians when they obtained cheap rifles, but mainly the white settlers, and, above all, the professional white hide-hunters. It is difficult to blame the men themselves, for some made a living out of it. But it is permissible to wonder at the shortsightedness of the State authorities and of the United States Government, who permitted the slaughter to go so far.

The moral for us of the Empire is plain. Where opportunity presents itself, we who know something of what may be going on in outlying regions wish to lose no chance of advocating, in season

and out of season, and at the risk of becoming nuisances, all reasonable and effective game preservation, and on right lines. And we maintain that this can best be done by Imperial Government action in the case of Crown Colonies and Protectorates; by a healthy and active public opinion working through Colonial Governments in the case of self-governing Colonies. And it may as well be understood here that effective preservation means more expenditure of money. Space will only permit me now to add that the pressing field for remedial action is, at present, in Africa. Much has been done there already, partly as a result of the International Conference of 1900, partly in consequence of the growth of a healthy public opinion on the subject in British Africa itself, and partly, I am glad to think, as a result of the action of the Society already referred to. The further general recommendations of this Society are before the Colonial Office, and are set out in a memorandum lately submitted to Lord Elgin.

GAME AND GAME RESERVES IN THE TRANSVAAL.

By Sir ALFRED E. PEASE, Bart.

Major J. S. Hamilton, the Game Warden of the Transvaal Sabi Game Reserve, contributed in Vol. II. of this Journal a very full and most interesting account of the present condition and prospects of the wild fauna within the Government Reserve. Since Major Hamilton wrote his article further evidence is forthcoming of the success that has attended his efforts. If the present policy could be guaranteed permanency, it is certain that this Reserve would be the means of not only increasing the head of game throughout the Eastern Transvaal, but of restoring the eland, the giraffe, and the elephant. When I left the Transvaal last year (1905) there were no eland left within the Reserve, and probably none outside in the Transvaal. Some five or seven giraffes still lived in the Reserve, and one small herd of elephants had entered it from Portuguese territory.

The question of the immediate future is what will be the attitude of the new responsible Government towards the Reserve, and it is important to secure a healthy public opinion on the subject of the preservation of the fauna of the Colony.

The present boundaries and condition of this Game Reserve would be difficult to maintain under any Government, owing to the number of highly mineralised farms owned by private individuals and companies within its borders, to the existence of mineral resources on farms and lands belonging to the Crown, and to the prospect of a railway being completed through a portion of the Reserve. The position may become more precarious when a representative Government is in control. I believe, however, that a great deal may be done to secure the results of the efforts of the past three years, even if a large area of the existing Reserve has ultimately to be abandoned. This paper is therefore supplementary to Major Hamilton's, and is written with a view of pointing out what is the general position immediately outside the Reserve on the eve of a new form of Government, and to press the necessity of an endeavour being made to educate public opinion and enlist its protection for all species of wild animal life which are harmless to the public interest.

Those who honestly fear the risk of increasing pests such as the tsetse-fly, and those who, out of simple cussedness, oppose restrictions on the slaughter of wild animals, are the people who are likely to be the most difficult to deal with.

It is a fact that in the Barberton district outside the Reserve the tsetse-fly has disappeared with the extermination of the buffalo, but it is by no means certain that it has gone *because* of their practical extinction; for there are still buffalo in the Reserve and no tsetse. There are plenty of zebra and other big game within and without the Reserve and no tsetse. My own idea is that the kind of forest country has quite as much to do with tsetse as the presence of buffalo, and that tsetse come and go in such places as present conditions more or less favourable to their propagation. If it is found that tsetse reappear in the Reserve with the increase of buffalo, the latter must be sacrificed; but I believe it may prove that buffalo can exist there without bringing tsetse.

A great deal has been done *outside* the Reserve in three years to save species of antelope from extinction and to increase largely the stock of others (such as roan, kudu, waterbuck, &c.), which was getting terribly low. The Game Preservation Ordinance has done great good and been well supported by the public, though subjected to a large amount of criticism, but on the whole sensible criticism. No doubt improvements can be made in the law which, while not impairing its objects, would secure even a larger amount of approval. The law requires adjusting to the needs of each particular district. Some species of antelope are very numerous in one district, or on some farms, and are extinct, or on the verge of extinction, in others. In the Barberton district you may have (or more correctly there are) large farms or estates on which a fine head, say, of reedbuck, or rooi rhebok, had been for years carefully maintained; and because the species was exterminated, or nearly so, on all surrounding lands, the proprietor is prevented by the Ordinance from enjoying any of the results of his care and trouble.

Now each district (generally the magisterial) has its own branch of the Transvaal Game Protection Society, and each district appoints its own committee to watch its interests, and sends delegates to the Central Council. The constitution is perfectly democratic, and through this machinery the general and local needs are brought before the notice of the Government and the final recommendations made by the Society regarded as authoritative. Thus the Lieutenant-Governor or Colonial Secretary under the powers vested in these officials under the Ordinance can prohibit, restrict, or permit the killing of particular species. Ultimately the survival or extinction of the more interesting and rarer fauna will depend on the public voice. During the two years I acted as Resident Magistrate in the Barberton district (over 5,000 square miles in extent) we preserved most strictly all the rarer animals, and I think the following notes give a pretty accurate account of how things stood in April 1905 outside the Reserve:¹

¹ I have placed * against those entirely protected. and † against those temporarily protected for a term of years or by withholding from season to season the issue of licences.

LION (*Felis leo*).—A few of these were reported from time to time. Seven were seen and one killed near Mallelane in 1904, several near Hector Spruit, and three seen near Mananga in April 1905. There were a few in the Lebombo bush and Lomati flats, but not seen by white men to my knowledge.

LEOPARD (*Felis pardus*).—Fairly common throughout the district, but seldom seen.

CHEETAH (*Cynaelurus jubatus*).—The hunting leopard is occasionally seen. I knew of a pair near Louw's Creek in 1904.

THE AARD WOLF (*Proteles cristatus*).—Not common, but occasionally seen even in the Kaap Valley.

THE SPOTTED HYÆNA (*Hyæna crocuta*).—A few in certain localities bordering on the Reserve, in the wilder mountains, and in the Lomati Flats. Traps and poison are gradually exterminating all carnivora.

THE BLACK-BACKED JACKAL (*Canis mesomelas*) is becoming rarer every year. I never saw one during two years' residence.

THE HUNTING WILD-DOG (*Lycaon pictus*).—Frequently reported; hunts in packs in and out of the Reserve, and travels quickly over great stretches of country.

OTTER (*Lutra capensis*).—Fairly common. Probably more numerous than generally suspected.

BLUE WILDEBEESTE (*Connochætes taurinus*).—Some nice herds of these still exist in the Lomati Flats, and there are a few near Hector Spruit.

†BLACK WILDEBEESTE (*Connochætes gnu*).—The last of these were seen at Louw's Creek in 1885.

THE BLUE DUIKER (*Cephalophus monticola*).—Ubiquitous and very numerous.

THE RED DUIKER (*Cephalophus natalensis*) is very common in the district; haunts bracken and bramble thickets and low bush in the mountain kloofs.

KLIPSPRINGER (*Oreotragus saltator*).—Common on most mountain ranges.

†ORIBI (*Ourebia scoparia*).—Becoming very scarce. I only knew of a few small herds in 1905—one lot of eight on Inyoko, one of eight in the Kaap Valley, and a few more near Kaapshe Hoop.

STENBOK (*Raphicerus campestris*).—Very common throughout the bush veld.

GRYSBOK (*Raphicerus melanotis*).—Two seen on the Lebombo Range in 1904; very scarce.

WATERBUCK (*Cobus ellipsiprimnus*).—Fairly common in suitable localities. Some near the lower reaches of the Kaap River and along the Komati and Lomati Rivers.

REEDBUCK (*Cerricapra arundinum*).—Common in certain localities, scarce in the Kaap Valley, numerous in the south-east.

ROOI RHEBOK (*Cerricapra fulvorufula*).—Common on moun-

tain-sides in most of the ranges. Numerous in the Kaap Valley hills, on the Lebombo, and in the wilder borderlands of Swaziland.

VAAL RHEBOK (*Pelea Capreolus*).—Common on the high mountains between Steynsdorp and Barberton. A few can be seen at times close to Barberton. They are numerous in the mountains towards Carolina.

IMPALA (*Aephyceros melampus*).—A nice herd near Louw's Creek; more between Malelane and Hector Spruit, and numerous on the Lomati Flats.

*ROAN ANTELOPE (*Hippotragus equinus*).—A few on the Lomati Flats. I have seen their tracks and droppings on the Lebombo Hills.

*SABLE ANTELOPE (*Hippotragus niger*).—None in 1905 south of the Crocodile River.

BUSHBUCK (*Tragelaphus scriptus*).—Very numerous throughout the district. Nearly every big kloof holds them.

*KUDU (*Strepsiceros capensis*).—A nice stock in one or two limited areas. I was told by a man (who knows most about them within forty miles of Barberton) that he estimated there were at least ninety within twenty-five miles of Barberton. I have seen numerous tracks of them near the Three Sisters.

*ELAND.—Extinct in the district. The last were killed during the war.

*BUFFALO (*Bos caffer*).—Practically extinct outside the Reserve. It is rumoured that there are a few in the low mountain-bush between Malelane and Jeppe's Concession. This is possible, but not probable.

*GIRAFFE (*Giraffa capensis*).—Extinct outside the Reserve.

*HIPPOPOTAMUS (*H. amphibius*).—Scarce, but more numerous in the Komati River than stated by Major Hamilton. I have seen in 1904 thirteen heads out of the water in one pool in the Komati River, and photographed eleven, and saw them this year, but never so many as thirteen at a time.

BUSH PIG (*Potamochoerus chæropotamus*).—Common in certain localities; in thickly wooded kloofs and valleys.

WART HOG (*Phacochoerus æthiopicus*).—Common in the bush veld.

*ZEBRA (*Equus burchelli*).—Fairly numerous on the Lomati Flats (south-east end); a small band near Louw's Creek.

*RHINOCEROS (*Rhinoceros bicornis*).—Extinct outside the Reserve. The last killed near Barberton was killed near the Three Sisters in 1894.

*ELEPHANT (*Elephas africanus*).—Extinct outside the Reserve for many years past.

The above, I think, includes all the larger antelopes that have been indigenous within the memory of the present generation in the Barberton district.

It may be as well to warn readers of this journal who are not

familiar with the names given in South Africa to certain animals, that among the extraordinary misnomers are the following: A leopard is called a tiger; a hyæna is called a wolf; a giraffe is called a camel or cameel; a zebra is called a quagga; a hippopotamus is called a sea-cow; a cheetah is called a leopard.

The following are some of the extinct or extremely rare survivors of species south of the Zambesi, as far as I can learn, or confined to comparatively restricted areas not mentioned in the foregoing notes:—

RED HARTEBEESTE (*Bubalis caama*).—Very rare in the Orange Colony and Transvaal; extinct in Cape Colony; a few in Natal; fairly plentiful in parts of South-West Africa.

BONTEBOK (*Damaliscus pygargus*).—Only exists on two farms in the Strand Veld (*vide* Sclater's 'Fauna of South Africa').

SESSAPY (*Damaliscus lunatus*).—A few in the North-Eastern Transvaal.

BLAAUWBOK (*Hippotragus leucophæus*).—Quite extinct for a hundred years.

INYALA (*Tragelaphus angasi*).—Common in Swaziland and low bush countries of the East Coast.

MOUNTAIN ZEBRA (*Equus zebra*).—Still found in very reduced numbers in parts of Cape Colony.

QUAGGA (*Equus quagga*).—Quite extinct since 1878.

WHITE RHINOCEROS (*Rhinoceros simus*).—Extinct except in the Zulu Reserve. Some thirteen survived there in 1904.

BLACK RHINOCEROS (*Rhinoceros bicornis*).—Extinct in Cape Colony since about 1853; in the Orange Colony since about 1842. Only a few survive in Zululand, and perhaps one or two in the Transvaal.

I should like to take this opportunity of placing before others who may be able to throw some light on the matter a statement that has several times been made to me in the Barberton District of the existence of two very distinct varieties of the rooi rhebok. One gentleman of my acquaintance, Mr. Chas. Currie, A.R.M., who is a keen observer and a sportsman of great experience, is absolutely positive of this being a fact. There is (1) the *Ingxala*, the common rooi rhebok, which is found in sugar-bush and mountain-bush; (2) the *Inhlang*, which is only found on bare, stony, and rocky hills where there is very thin bush or even none. The latter is distinctly lighter in colour, bigger and heavier in the body, and carries a smaller head. I do not know if I have spelt the native names right; possibly they should be written N'xala and N'hlang.

I might add that the Barberton district is extremely rich in small mammals, such as the cats, mongooses, zorillas, lemurs, rats, mice, bats, &c., as well as ant-bears, pangolins, porcupines, &c. The former have never been properly collected or scientifically studied, and I believe a naturalist would find it a rich field for

research. Birds have been collected, but as the district presents every variety of altitude and climate, high, low, and middle veld, bush veld, forest, mountains bare and wooded, and heavily timbered kloofs, and is traversed by several large rivers, I doubt if any really representative collection has been made. I doubt if a better field for the ornithologist can be found in the Transvaal. I had hoped to study the ornithology of my district, but had neither time nor opportunity to do so during my two years of residence, but saw enough to convince me that a year's observation and attention to the birds would yield a great deal of new information, and probably not a few new species and varieties. I shall be happy to give any information in my power to assist any naturalist who has any idea of going there, and could give the names of residents who would be likely to supply useful information.

As a practical suggestion, may I remark that I believe no small good might be done by the circulation of our journal among the branches of the Transvaal Game Protection Society, the resident magistrates, the editors of local newspapers, and the members of the new Legislature?

NOTES ON GAME IN SOUTHERN RHODESIA.

By VAL GIELGUD.

The rapid occupation and settlement of Southern Rhodesia, which comprise all the territories of the British South Africa Company south of the Zambesi River, gives a most useful example of the evolution of a civilised State from a condition of primæval barbarism. A most useful example, because the changes brought about in this country during the last seventeen years are almost without parallel, for not only has the country been conquered and annexed, but also actually inhabited by white settlers.

These settlers are scattered throughout the length and breadth of the country, engaged in mining, trading, and farming, while in various localities large towns have sprung into existence.

From the very commencement of the occupation, and for nearly the whole period of these seventeen years, it has been my lot to be in a position to observe the effect of this civilisation upon the wild game of the country.

At the time of the occupation of Mashonaland (1890) the game in South Rhodesia was not so numerous as in North-West Rhodesia or the Portuguese East African possessions.

This was probably due to the fact that the Matabele were in possession of a large number of guns and rifles, a considerable percentage of which were breech-loaders, and also that the Dutch and English had for a long time been in the habit of undertaking yearly hunting expeditions in this country. Game was, however, fairly plentiful, and very good sport could always be obtained if one knew the country.

Late in the year 1895, or early in 1896, the disease known as rinderpest crossed the Zambesi River, and attacked both the wild game and the cattle of the country.

This disease on its way to the South was, I believe, responsible for the death of 75 per cent. of the game in Matabeleland.

The North of Matabeleland, where the game was most plentiful, is in parts very waterless, and its concentration at the drinking places was, I think, probably responsible for the great havoc wrought by this disease. It has appeared to me that in districts or countries where water is plentiful, the damage done by rinderpest was not so great as in the more waterless localities. Since this epidemic of rinderpest the game has, in my opinion, steadily increased, and is each year increasing more rapidly in ratio to the greater number of game now present in the country. In fact, the point I wish to press is that disease, and not the

contact of a civilising agent, was the cause of the tremendous diminution of the game of South Rhodesia, and that the disease having now died out, or become enzootic, the game is increasing, even under conditions which are generally recognised as detrimental to the preservation of big game.

The fact that game had become so scarce after the rinderpest was the means of preserving it automatically.

Hunting parties were disappointed, Southern Rhodesia became unfashionable as a hunting ground; it was not worth anyone's while to hunt there.

Also the rapid extension of railways and the decrease in the number of transport riders, caused not only by the building of railways, but also by the death of the transport oxen by rinderpest, were factors in favour of the wild game in their struggle for existence.

Then there was the prospector, who wandered through the wild places of the land and yearly shot large quantities of game as food for himself and his boys. As the years went on he too disappeared, and his prospecting camps were replaced by permanently established mines.

Lastly, the effective disarmament of the entire native population was perhaps the greatest aid towards the preservation of the remnant of wild game.

The result of these conditions was that the game left the vicinity of the mines, the railways, and the waggon roads, where they were liable to constant disturbance, and took up their habitation in remote localities, where they were not followed (for, indeed, there were no longer any hunters), and where their presence was scarcely suspected, except perhaps by a few native commissioners or others in whose districts such havens were located, and whose business caused them to travel through such unfrequented country.

Sportsmen who visit the country, and who are disappointed in their sport, are often responsible for the reports that game in such a country or of such and such a species is in danger of extinction.

The commonest reasons for such failure to obtain good sport are that the information at their command is faulty or that the time at their disposal is too limited.

Such men, often men of position living in the mid-stream of life, are more apt to make their views public, and more likely to be listened to than are obscure officials, hidden away in native districts in far-off lands, passing their life in its back-waters.

One is sometimes inclined to believe that the extinction of game and the decrease in the number of good shooting grounds are two phases of this question which are liable to confusion.

NATIVES.

With regard to the natives, the preservation of big game in Southern Rhodesia is greatly simplified by the fact that they are

completely disarmed and that their special right to kill game is in no wise recognised.

None of the native tribes in Southern Rhodesia are, or even were, in any way dependent on the game of the country for a living, and the larger and ever-increasing demand for native labour in South Africa gives them every opportunity to earn money to purchase whatever they may be in need of.

The Amasvina, a section of the Makalanga nation, who inhabit Mashonaland, still continue, by means of driving game into their nets, to kill a considerable quantity of small buck, but, as this procedure is unlawful, and the administration of the country becomes yearly more effective, this manner of hunting will gradually be put a stop to.

TSETSE-FLY.

To my mind, the condition in Africa which threatens to become the greatest danger to the effective preservation of big game is the spread of the tsetse-fly (*Glossina morsitans*).

With the panic of the rinderpest, the fly for some years became almost extinct in Southern Rhodesia, but now seems to be rapidly increasing.

It appears to be returning to all its old haunts.

I am certainly of opinion, after years of residence in the fly area, that it is not possible to assign fixed limits to fly areas, and that fly (*Glossina morsitans*) does certainly not only confine itself to hot moist river valleys.

I have repeatedly found fly in very great numbers at an elevation of over 4,000 feet, on the highest ground in the locality; in fact, on the summit of the Iwide, which separates two streams, the ground where the game stands during the day.

I have known fly to shift from one locality to another, disappear and reappear, following, I have always imagined, the migration of the game.

In such newly settled countries as Rhodesia public opinion is violent, loud spoken, and cannot be disregarded, and such opinion is undoubtedly adverse to the preservation of game in fly areas, arguing that the protection of the game is tantamount to the preservation of the tsetse-fly.

I see that doubt has been thrown on this presumption, but public opinion is hard to convince, and that such a sequence is not the case will have to be very clearly proved before it will be accepted by the settlers.

Added to the distrust produced by the known attributes of the fly (*Glossina morsitans*) is the added terror that it may possibly carry the germ of the dreaded sleeping sickness.

Of course public opinion is ignorant; it is ill-informed and does not distinguish between species of fly, but the lay mind is

slow to grasp niceties, and the line generally adopted by those who have much at stake is that it is better to take no risks.

As I have perhaps made clear, it is my opinion that the wild fauna in Southern Rhodesia is at the present moment in no danger of extinction; but I am also convinced that reserves are necessary if it is to be permanently preserved.

The game laws of the country are on the whole excellent, although the usual difficulties arise with regard to enforcing them in out-of-the-way places.

The amendments which I would suggest would be that the sale of all game meat be prohibited, that an export duty be placed on horns and hides, and a licence required for their sale within the country, and that a difference be made between the price of licences issued to sportsmen and to inhabitants of the country, in favour of the latter class.

As regards reserves, a reserve has recently been proclaimed in the North of the Lomagondi district, the Northern border of which is the Zambesi. This reserve, which is in a very out-of-the-way place, is admirably suited for the preservation of elephant, black rhino, waterbuck, Burchell's zebra, bushbuck, pala buffalo, both species of pig, and even kudu, and all kinds of buck which find their home in low veldt and thick bush.

It is not suited, however, as a home for sable and roan antelope, giraffe, gemsbok, or reedbuck, nor is it very suitable for eland.

At present no suitable reserve exists for the preservation of these last-named species.

In conclusion, I should like to mention an existing condition which appears to me to be an anomaly.

The Zambesi River is the boundary between North-West and Southern Rhodesia.

In Southern Rhodesia hippo are royal game, and are strictly preserved; in North-West Rhodesia they are not protected at all.

The result is that the hippo on the Zambesi River between the Victoria Falls and Feira are being exterminated, as it is the easiest matter in the world to evade the Southern Rhodesian law by stating that all animals killed have been shot from the North-West Rhodesian bank of the river.

NOTES ON GAME IN NORTHERN RHODESIA.

By G. GREY.

Probably Northern Rhodesia contains at the present time as great a variety of game as any part of Africa of the same area.

The varieties of antelope now existing in Rhodesian territories north of the Zambesi are: Eland, roan antelope, sable antelope, koodoo, Lichtenstein hartebeeste, tessebe, blue wildebeeste. Penrice's waterbuck, lechwe (black and red), pookoo, situtunga, reedbuck, impala, bushbuck, duiker, oribi, klipspringer, grysbuck, yellow-backed duiker. Also a small antelope, somewhat similar to the blue buck of Natal, which, I think, has not yet been accurately identified; it is to be found, I believe, only near the Luapula River in North-Eastern Rhodesia.

Other varieties of game are: Burchell's zebra, buffalo, warthog, bushpig, elephant, hippopotamus, rhinoceros, lions, leopards, and other carnivora.

One small herd of giraffe was known to exist a few years ago in the valley of the Loangwa, and possibly still exists, for great efforts were being made to preserve the herd.

Since the rinderpest swept through these territories in 1895, I do not think that any species, except elephant, have diminished to an important extent.

Northern Rhodesia may be considered now as a district in which preservation of all these species is practicable and possible by wise regulations efficiently enforced.

North-Eastern and North-Western Rhodesia are under separate administrations; the game laws are different in the two territories, but both have the same principle of charging a small licence to permit the killing of the common varieties of game, protecting the rarer kinds by a higher licence, restricting the number of elephants killed by each licence-holder, and prohibiting the killing of one or two species which are especially rare, such as giraffe.

North-Western Rhodesia differentiates in the cost of licences between residents and visitors, and removes all restrictions (except as regards elephants) for game killed in tsetse-fly areas.

Though there is no section of Northern Rhodesia in which game exists in the large quantity found in parts of British East Africa or in the Pungwe River flats of Portuguese East Africa, yet Northern Rhodesia contains in the aggregate, scattered through its whole extent, a large quantity of a remarkable variety of species, and for this reason merits careful consideration as a district in which those species may be preserved.

There are conditions obtaining which would seem to render the establishment of reserves a matter of great difficulty.

The British South Africa Company, by special treaty with Lewanika, the king of the Barotse, reserve for that chief and his people hunting rights over a large portion of North-Western Rhodesia. The nearest approach to a reserve which could be made in the territory originally ruled over by Lewanika would be to prohibit white people killing game—a useless restriction while the Barotse and adjoining subordinate tribes are free to hunt everywhere, and have, as is at present the case, a very large supply of guns and ample opportunity to buy powder in the adjoining Portuguese territory.

Again, considering the whole of Northern Rhodesia from the point of view of natives, game preservation, and reserves in particular, though no part or very small areas of the territory are thickly inhabited, yet there is very little uninhabited country; it is difficult to propose any area as a reserve which would not include a considerable native population. Besides elephants, many species of antelopes, and particularly pigs, do much damage to native crops. Entirely to prevent natives in any district from killing game, and to turn any large area into a sanctuary, would impose a real hardship on the native inhabitants, who are generally a peaceful and industrious agricultural population.

But should the administration for these reasons find it impossible to set apart reserves, adequate legislation should still be able to protect the game in quantity.

In South-Central Africa, wherever muskets and powder are obtainable by the native, it is the native who is the great game destroyer. Before he got firearms he trapped and hunted with bows and arrows, but made little impression on the number of game; but with firearms he exterminates. North-Eastern Rhodesia has been able to stop the import of powder, and in that country there seems little danger of the game being diminished by natives. Not so in North-Western Rhodesia, where the long Portuguese boundary and the Barotse and other as yet semi-controlled tribes foster the importation of and trade in powder. Recent occupation by Government posts in the North-West of North-Western Rhodesia has to some extent made the work of the Portuguese powder trader a matter of difficulty; but the trade in powder and guns is by no means stopped, and the game will continue to decrease at the hands of the native until control of the importation of powder from Portuguese West Africa is effected.

But the native is now only a danger to game in parts of Northern and Western North-Western Rhodesia. In the rest of Northern Rhodesia legislation prohibiting the slaughter of game by white hunters and settlers is all that is necessary to preserve the various species in quantity.

More than, or fully, half of Northern Rhodesia is tsetse-fly

country, the common species of tsetse-fly being *Glossina morsitans*, known to transmit the trypanosome of nagana to domestic animals. The presence of this fly transmitting a fatal disease to cattle and all transport animals prohibits the settler from taking up much fertile good grazing land in Northern Rhodesia and adds great difficulties to the growing mining industries.

Much is still to be learned about the tsetse-fly. My own experience of eight years in tsetse-fly countries has convinced me that where there is no game there can be no *Glossina morsitans*; that the destruction of game effects the disappearance of this tsetse; and that where tsetse originally existed, the reappearance of game means the reappearance of the tsetse-fly.

This is instanced by the destruction of game by the rinderpest in Northern Rhodesia, and the subsequent diminution of and disappearance in large areas of the tsetse-fly. Later the game has increased, and with it the tsetse-fly and the disease have come back.

Trypanosomiasis in man (sleeping sickness) is spread by a tsetse-fly. *Glossina palpalis* is known to spread this terrible disease. But, again, much is to be learned, and the highest authorities in that branch of medical science which has studied this disease and its transmission will not admit that *Glossina morsitans* is not a transmitter of sleeping sickness, claiming even that it probably can transmit, and that until the contrary is proved it must be regarded as dangerous.

The schools of tropical medicine are actively studying both in Europe and Africa trypanosomiasis and the means by which that disease is spread.

It may be—it seems even probable that it is the case—that the presence of the larger mammals on which the tsetse-fly lives means incidentally the presence of and spread of disease fatal to man and domestic animals. If this is so, and it is to be hoped that medical science will soon be able to give definite information on this subject, there should be no attempt to preserve game in tsetse-fly areas. Happily there is plenty of Africa free from tsetse-fly in which game abounds and in which preservation is possible. I believe that effective prohibition of the sale of powder to natives is the first and most important step necessary to preserve all species now existing in Northern Rhodesia, and that if the Government, having ensured that extermination by natives is impossible, imposes from time to time, as may seem necessary, judicious restriction of the number of head of game of each variety killed by hunting parties, there will be no danger of the extermination of any species.

GAME RESERVES.

By F. GILLET.

The hopes of this Society are largely centred at the present moment on reservations for preserving the big game of the world, and no doubt reservations will help to do so for a time; but that they will more than stave off the evil day, when most of the species have become extinct, I do not for one moment believe. However, my object in writing this article is not to decry the very praiseworthy attempts of the Society, but to point out the many difficulties that stand in the way of their attainment, in the hope that these may be overcome.

I am not going to say anything whatever about game laws and regulations in this article, but confine myself entirely to the question of reservations.

There is one factor against the preservation of big game which it is quite beyond the powers of this Society to defend itself against, and which will always, like the sword of Damocles, hang over any and every reservation wherever situated. A war or a native rising may in a few weeks sweep away the results of years of care and protection, and against this the Society can do nothing.

Against all the other dangers to which reservations are liable the Society can raise its voice, and, provided these difficulties are overcome or avoided in the first instance, there is a very reasonable hope that the big game may be saved for years to come.

A reservation should be large enough not only to cover the migrations, but also to carry large herds of the species it is intended to protect, because it must be borne in mind that very sweeping epidemics frequently occur, and one or more species might be entirely exterminated; the larger the herds, the more likely is it that there will be a remnant left with which to commence again.

Now it is frequently urged that a small reserve well protected is better than a large reserve badly protected. This view, in my opinion, is suicidal, as I do not consider a small reserve is of any use at all, unless you only intend to look a very few years ahead.

Make your reserve as large as possible, and protect as much of it as you can thoroughly well; the remainder will be better off than if it were not in the reserve at all, and possibly the money question, which is a great difficulty at the present time, may improve in the future and make it possible to protect the whole reserve thoroughly well later on.

A reservation should not have any settlers or natives on it, and, as far as possible, people should not be allowed to pass through it

with weapons in their possession. This, of course, is another difficulty which, however, can be overcome if suitable positions are taken for the reserves in the first instance.

And here I would urge again, as I have already done at a meeting of this Society, that sanctuaries should not be made alongside or near railways or navigable rivers if such positions are at all likely to be suitable for settlement. I am quite aware that at the present time it may be less expensive to look after them if so placed; but one must look farther ahead than that. As settlement increases, the most valuable sites will be those I have mentioned. A good reserve may also be a good farming or grazing country, and the settlers will wish to get as near as possible to the means of exporting their produce. The result will be an outcry from the settlers: 'Give us this land and make your reserve elsewhere'; and it will be backed up by the railway company and public opinion.

When a reservation has once been made far away from railways and settlements, then if it is proposed to run a new railway through or alongside the reserve, every effort should be made to oppose it, provided that it is possible to build the railway further away, without damaging the interests of the railway company or other commercial undertakings. We must not forget that there are three questions of greater importance in young Colonies and Protectorates than game preservation, and these are the native question, the rights and needs of settlers, and commercial undertakings endeavouring to develop the resources of the country.

Now if we press game preservation to the detriment of any of these we shall be doing the Society an infinity of harm, at the same time losing the backing of public opinion, which is of the very greatest use in advancing our object.

I do not say weakly give way the moment there is any opposition, but I do say think well beforehand and arrange your reserves, as far as possible, so that they will not in the future be likely to be attacked with good cause.

With regard to the keeping down of carnivora I will say nothing. This question is so thoroughly well appreciated that it will not, I am sure, ever be overlooked.

The last point with which I want to deal in regard to reservations is the question of inbreeding, which will surely lead to deterioration and eventual extermination of the herds.

The Yellowstone Park is often quoted as an ideal reserve; but whereas in this reserve you have only the wapiti, mule, deer, bear, and buffalo inhabiting the lower elevations, and sheep the higher, in a reserve in Africa you may have twenty-four different species, all inhabiting more or less the same country; and to protect all these species you require a very much larger area of country in proportion to the very much greater number of species which it is your object to preserve.

To give some idea of protection and the eventual result of in-breeding, I will quote from 'Lydekker's Royal Natural History.'

In 1820 it was estimated there were 500 European bison (*Bos bonassus*) in Lithuania, and about this time active measures were taken to protect these creatures. In 1830 they increased to 700. In 1831, owing to a local revolt, they decreased to 637. From this date to 1860 they increased steadily till it was estimated there were 1,700. In 1863, owing to the Polish uprising, their numbers were decreased by half—viz. 847. After peace was restored they increased slightly and then began to decrease. In 1880 there were 600, and they are still on the wane. The buffalo in the Yellowstone Park are becoming decadent from in-and-in breeding.

Now I wish to draw your attention to the Sabi Reserve, on which something like £4,000 to £5,000 a year is being spent.

We have a report in the Journal of this Society (Vol. II. p. 26, dated October 13, 1903) giving a list and probable numbers of the species that used to, or at the time of writing, inhabit the reserve. The number of species mentioned are twenty-four; of these, four—viz. elephant, eland, hartebeeste, and ostrich—are not now found in the reserve at all; next we have nine species, represented by from one to sixteen individuals of each species; after that, six species represented by from thirty-five to one hundred individuals of each species; three more species spoken of as numerous; and, last of all, two species well represented by 9,000 and 2,000 individuals respectively.

A second report from the same reserve is to be found in the same volume (p. 34, dated July 31, 1904—viz. the following year), and I gather from it that some extra ground has been added called the Lydenburg and Pongolo Reserves.

Taking these three reserves together you will find that the first four species are still unrepresented; the next nine have considerably increased, owing to taking in the new ground; the six that follow have decreased, most of them by more than half; the three species spoken of as numerous are not so in reality; and the two species which the year before were represented by 9,000 and 2,000 individuals have dwindled away to very few, probably having migrated.

Now, in my opinion, this reserve will not, on the figures shown, save any species for any length of time.

With such very small herds of the various species there is only one possible way of counteracting the ill-effects of in-and-in breeding, and that is by importing every few years fresh blood from other reserves. This is, of course, a costly and possibly an almost hopeless remedy, but it is the only one if any permanent gain is to be derived from this reserve.

Sufficient ground should certainly be added to the reserve to cover the migration of the impala and reedbuck—the only two species whose numbers warrant any expectation of being able to

save them for any great length of time without fresh blood being imported.

I give a table of the animals with their numbers, the last column being for the year 1903:—

Sabi, Lydenburg, and Pongolo Reserves.

—	Sabi	Lyden- burg	Pongolo	Total, 1904	Sabi, 190
Elephant	—	—	—	Nil	Nil
Eland	—	—	—	Nil	Nil
Hartebeeste	—	—	—	Nil	Nil
Ostrich	—	—	—	Nil	Nil
Rhino	20	—	—	20	1
Roan antelope	19	—	—	19	2
Giraffe	18	16	—	34	5
Tessebe	—	—	—	—	5
Buffalo	16	17	—	33	8
Sable antelope	14	9	—	23	12
Hippo	17	18	—	35	16
Bushbuck	6	4	—	10	Rare
Bushpig	7	12	—	19	Rare
Koodoo	13	15	8	36	35
Blue wildebeeste	11	6	—	17	40
Zebra	12	8	—	20	40
Mt. Reedbuck	8	14	—	22	40
Klipspringer	9	13	—	22	50
Waterbuck	10	5	20	35	100
Steinbuck	3	2	a good many	say 105	numerous
Duikers	2	1	a good many	say 103	abound fair number
Warthog	5	11	—	16	abound fair number
Impala	1	7	2 or 3 troops	say 100	9,000
Reedbuck	4	3	—	7	2,000

RESERVATIONS IN NEW ZEALAND.

‘ Huiakama, Stratford, N.Z. :
July 8, 1906.

‘ RHYS WILLIAMS, Esq.,

DEAR SIR,—It will afford me singular pleasure to collect some data with reference to preservation, acclimatisation, &c., to forward in due course. Meanwhile it may be broadly stated that Little Barrier Island in the north, and Resolution Island in the south, have been devoted by Government to the exclusive purpose of preserving such of our avifauna as are suited to the respective conditions, under responsible custodians to ensure absolute sanctity from intrusion.

‘ A number of the chief mountains are reserved—each with a liberal radius—as “ national parks,” some being also sanctuaries for native and acclimatised game and other birds and animals. A large number of birds are gazetted as permanently protected.

‘ The destruction of forests inevitably entailed in the rapid development of settlement is causing an alarming decrease of edible native birds, though the finest of them—our beautiful wood-pigeon—nominally enjoys statutory immunity everywhere every third year. A factor of the highest importance consists in the annual session of delegates chosen from the “ Association of Acclimatisation Societies.”

‘ It is needless to indicate the difficulties which *universally* beset all attempts at curtailment of slaughter. We are face to face with every one of them in this ultra-democratic community. Only a few years ago the late Prime Minister roundly threatened to tear the last vestige of a game law from our statutes in response to an *ad hominem* appeal in the interest of a fined delinquent !

‘ However, most fortunately for our cause, the economic aspect of it, as intimately affecting the success of the “ Tourist Department,” appealed to the Government, and much improvement is visible, with more impending, we fervently hope.

‘ H. J. MUSSEN.’

THE DOMESTICATION OF THE AFRICAN ELEPHANT.

1. By P. L. SCLATER, D.Sc., F.R.S.

In my article 'On the Best Mode of Preserving the Existence of the Larger Mammals of Africa for Future Ages,' published in the second volume of this Society's Journal, I placed the African elephant at the head of the list, and stated that it would be a disgrace to our age to allow such a fine and noble animal to perish off the face of the earth. In order to meet this very undesirable (but likely) contingency, I suggested that a 'kheddah' should be moved across from British India to British East Africa and established on the slopes of Mount Kenia for the purpose of capturing and taming the African elephant. Much to my surprise, however, I have lately ascertained that the authorities of the much-abused Congo Free State have been before us in this matter, and at their station on the River Welle have already established a mission expressly for this object. Moreover, as will appear from the article on this subject in *La Tribune Congolaise* of August 5, 1906, of which I subjoin a translation, the Mission appears to have attained a considerable amount of success. Under these circumstances it will be, perhaps, not necessary to go to the expense of importing a 'kheddah' from India. What the officials of the Congo Free State have done on the Welle, our officials in British East Africa might surely do on Mount Kenia, if supplied with the necessary means and instructions. If our officials meet with difficulties in the matter, they might even be instructed to cross the border into the Congo Territory and take a lesson from the Free State authorities on the capture and taming of the African elephant.

I subjoin a translation of the article on 'The Domestication of the Elephant in the Congo Free State,' published in *La Tribune Congolaise*, as above mentioned:

'The courier who has lately returned from the Congo has brought us some interesting news from the Mission formed for the capture and training of elephants which has been established at Agri, on the River Welle.

'The number of elephants captured—which, on December 31, 1905, was only thirteen—has increased considerably in consequence of the captures effected during the months of January, February, and March of this year, and at the end of March had reached the total of twenty-eight. Some of the young elephants

which had been at the Mission for several months accompanied the hunters in their expeditions, and their presence served to render the newly captured animals more confiding and less disposed to attempt to escape.

‘ The attempts to break in the animals have been persevered in, and the result recently obtained has been very encouraging.

‘ Since last February the elephants have carried all the bricks required for the construction of the houses at the station. Every morning five elephants have made fifteen transits between the brick-kiln and the houses being built. Each elephant carried two baskets of bricks weighing thirty kilos. for the stronger, and twenty kilos. for the weaker animals. As only four pack-saddles were available, the fifth elephant was made to draw a small cart. Some of the elephants objected to drawing the cart, but it was proved that those which worked hard thus developed their muscles and were in excellent health. Some large trunks of trees have also been transported by means of the cart. The Mission was much occupied in finding a suitable pack-saddle which would adapt itself exactly to the body of the elephant. This was by no means an easy thing, because the shape of the body of the young African elephant is entirely different from that of our domestic animals. The body is much larger and higher behind than in front.

‘ At night time some of the elephants go of their own accord into their stables. About a dozen of them do so of their own free will; but others, in spite of the attraction of their food, prefer to remain outside and to wander round the zareba.

‘ The presence of the young captured elephants within the Mission attracted the notice of the older elephants in the surrounding forest, and, it was feared, might occasion the escape of some of the captives. On March 26 a large elephant was found in a field of manioc, and was shot by some of the hunters. The body was measured and weighed. The height was found to be 2.70 metres, and the total weight 5,394 kil.’

2. THE KHEDDAH IN THE CONGO FREE STATE.

By Monsieur NIBUELD.

‘Bruxelles, le 24 Janvier, 1907.

‘MONSIEUR,—Comme suite à la demande contenue dans votre lettre du 14 décembre 1906, j’ai l’honneur de vous adresser, ci-joint, une note sur les essais de capture et de dressage des éléphants du Congo, tentés par une mission organisée par l’Etat Indépendant du Congo.

‘Afin de vous renseigner également sur les mesures prises pour la conservation des animaux sauvages—sujet que mentionne également votre communication prérappelée—je joins aussi un exemplaire du décret du 29 avril 1901 réglementant cette question pour les territoires de l’Etat Indépendant du Congo.

‘Agréez, Monsieur, l’assurance de ma considération très distinguée.

‘Au Nom du Secrétaire d’Etat,

‘Le Secrétaire Général

‘du Département de l’Intérieur,

‘NIBUELD.’

(Translation.)

The Congo Free State, in consequence of reports received from several people employed in the domestication of elephants, decided in 1899 to try an experiment in this line themselves. A mission to capture and train the elephants was organised, and it was placed under the direction of Commandant Laplume.

The instructions were to organise the captures in the district of Uele, where numerous troops of elephant are found. Different means were tried for taking the pachyderms. Pits were dug, covered with grass and branches, but in the rainy season the covering of the pits sunk, owing to the added weight. This system meant a great deal of work, and as it led to no appreciable result, it was abandoned, and drives were organised.

It was not possible to capture the adult elephants. Moreover, apart from the difficulty of watching them, taking care of them, and feeding them, they were very wild and dangerous. They then had to confine themselves to trying to capture the young elephants, who were more gentle, easy to watch, and whose education would be accomplished with fewer difficulties. But here there were other reasons for failure. When the beasts were too young they died a few days after the separation from their mothers, or inexplicable

ailments knocked them over in a few days. Several of the larger ones succeeded in escaping.

The total number of elephants captured since the commencement is 132. Of these, twenty-two had to be released, owing to their tender age, eighty-six died from various causes, leaving twenty-four, which have, since their capture, been the subject of attempts at domestication.

The training at the commencement was rather neglected, the time being occupied with the captures. They began at first to make the elephants tame; then, by loading the strongest of them with light burdens, they accustomed them to drag branches; finally, they put on some special harness which had been sent out from Europe. They thus gradually succeeded in making them drag little waggons loaded with materials, and in making them join in field work by dragging the plough.

The experiments in training them have resulted in interesting observations. Training has to be begun carefully and gradually. The elephant responds to good treatment, and better results are obtained by gentleness than by force. In short, the difficulties have been great, but the work has been greatly facilitated by the presence of elephants already trained. Not only are fresh captures led to the encampment when accompanied by the old ones, but they are also tamed much quicker and lend themselves with better grace to the work demanded of them, following the example of their tame companions. This is all the more encouraging, as it foretells the complete solution of the problem of the domestication of the African elephant.

THE RENAISSANCE OF BIG-GAME HUNTING IN
NOVA SCOTIA.

By EDMUND F. L. JENNER.

The province of Nova Scotia is slightly larger than Wales. It contains a population of about five hundred thousand. The Annapolis and Cornwallis Valleys are thickly populated; mixed farming and apple-growing are the chief industries.

My experience with the big game of this region dates from 1886. At that time the moose were just recovering from the wholesale butchery which took place in the deep snow a few years previously. Had it not been for the formation of the Nova Scotia Game Society, and the activity of certain of the game-wardens appointed by that body, moose would be as extinct in Nova Scotia to-day as the elk is in Ireland, or the dodo in Mauritius.

The late Commissioners Crooker (of Queen's County), Murphy (of Mount Uniacke), and the following gentlemen, who are alive at the present day, A. O. Pritchard (of New Glasgow), Major Daley (of Digby), Charles McIntosh (of Sherbrooke), George Piers (of Halifax) took upon themselves the unpopular and thankless task of saving the remaining moose. The survivors of the movement are elderly men; most of them have hung up the rifle and snowshoes. Their positions have been filled by younger men, but it is to their pluck and energy that Nova Scotia owes its present stock of moose.

I have alluded to the killing in the deep snow. This was, to my mind, the most deadly form of poaching. In March, when the snow was from three to five feet deep in the woods, gangs of men would go out with 'moose-dogs.' These animals were for the most part mongrel bulldogs, weighing from sixty to one hundred pounds, ferocious as wolves, and able to travel on a 'crust' a moose would break through. A 'yard' having been located, certain of the hunters would post themselves to leeward of it; the others, with the dogs, would work round to windward. The combined scent of men and dogs would probably start the moose, the dogs would be slipped, and the moose would be driven past the guns on the opposite side of the 'yard.' If the guns failed to bring them down, the pursuit continued; the dogs snapping and tearing at the fugitive moose, the poor creatures floundering through the deep snow, and the hunters following them on snowshoes at the rate of three or four miles an hour. Now, while a moose can travel ten or twelve miles an hour through deep snow, he never goes in a

straight line. By 'cutting corners' the hunters could keep within reasonable distance of him, and when at last he—or more probably she—turned to bay, the hunters could easily ascertain the fact from the change in the dogs' voices. When the snow was not too deep the moose usually put up a valiant fight for life. In March the bull moose has always shed his horns, but he still has the use of his fore-feet, and many a moose-dog has been eviscerated and pounded out of existence by the moose at bay. The cow at bay is even more dangerous than the bull. Provided she is not heavy with calf, she is quicker and more vindictive than the bull. Her hoofs are sharper and more pointed; one blow from them will put man or dog out of action.

The 'breaking a yard,' as I have described it, usually led to all the heavy moose, including the cows with calf, being killed. The choicest parts of the meat and the hides would be taken out of the woods. The remainder of the carcasses would remain where they fell, and serve as food for the wild-cats and bears. This is ancient history, however. At the present day there are not a dozen moose-dogs left in Nova Scotia, and it is a long time since anyone stood trial for 'dogging.'

Another most destructive practice was, and still is, the practice of snaring. Snares of stout rope were set in the paths and in the openings of 'hedges' (specially constructed for the purpose); large numbers of moose were, and a considerable number still are, caught in them. For reasons other than the vigilance of the game-wardens, to which I will revert later on, the unsportsmanlike practice of snaring is on the decrease. While snaring has perforce to be carried on in the fall before the frost comes, and is not so destructive to cow moose as dogging is, it has one most repulsive feature. The snarer is frequently very remiss about looking after his 'ropes,' and the moose which is caught in one of them will as likely as not perish from starvation and thirst. Owing to a great variety of causes, 'ropes' set in the fall may remain set all the winter, and do their deadly work in the following spring and summer. In my experience as game-warden I have had painful evidence of this fact. On two occasions I have seen the carcass of a noble bull, with his horns in the velvet, rotting in a wood road—the victim of a snare set a year previously, and never taken up. Snaring has not decreased in the same proportion that 'dogging' has; and as long as we have any moose, snares will be set and moose will fall victims to them.

At the same time, for every snare set now, there were five set ten years ago. A certain number of backwoodsmen still 'take chances' on getting their winter's meat, and a certain number of pot-hunters run risks to procure moose meat for market.

In the year 1887 the moose began to increase in numbers. I was a mere boy then, and I resided in King's County. In the spring of that year I found time and means to take a vacation in

the woods. My companion was a man many years my senior, a good sportsman, and now, like myself, a game-warden. I can remember his remark, as we rested on a boulder at the spot where civilisation ended and the wilderness of the 'South Woods' commenced: 'Ten years ago, Jenner, a man could kill all the moose he wanted within five miles of the rock we're sitting on. Now there ain't ten moose in the whole county.' Two years ago I sat on the same rock with him. He recounted a tale of woe about a poacher he had failed to convict; and when he had finished I asked him how many moose he thought there were within five miles of us. 'The fire played the devil with them, but there must be over twenty. Over on the other side of the lake there's over a hundred. I haven't known them so plentiful since I first knew you. Reason why? It's plain enough. There isn't a solitary moose-dog left, and the tourists and hunters who are coming and going all the time cut the snares up or spring them.'

Now there's where the whole crux of the matter comes in. It's not the game-wardens or the game society who can protect our game; it's the people of the Province in general, and the younger people in particular, who can do the work. Game laws, sumptuary laws, any laws at all, are no use in modern days unless they are backed by public sentiment.

Twenty years ago there were comparatively few people who took their vacation in the woods and spent their money in the enjoyment of 'the outdoor life.' The ideal holiday for the clerk was a trip to town—'town' might mean Boston, Halifax, or St. John. Nowadays you are continually being consulted as to the best kind of rifle to buy, the relative merits of guides, and the advisability of taking a vacation in 'calling time' or when still-hunting is in season.

The Nova Scotian boy of to-day is a far keener sportsman than his father was twenty years ago. The reason for this is a simple one. Twenty years ago the moose existed in a small area only; to-day moose are to be found in every county in Nova Scotia, Antigonish possibly excepted.

Twenty years ago the majority of the moose killed fell victims to the 'rope' or were shot out of season. Nowadays every town contributes its quota to the army of sportsmen who fill our woods from the opening of the season until the frost comes. Young men and boys who have saved up for months, with the one idea of taking a trip to the woods and returning with a good head, do not look kindly on the snarer or the dogger.

In and near my own little town of Digby during the past season nine young men and boys went to the woods, and returned with the limit the law allowed them—one moose each. Quite a number of others went, and returned empty-handed. The moose were there, the caller was all right, but—one of the thousand and one things which cause a moose hunt to fail occurred.

All down the line of the Dominion and Atlantic Railway, from Yarmouth to Windsor Junction, almost every town and village had one or more moose to its credit. These moose were not killed by wealthy sportsmen who could devote unlimited time and money to the chase. Most of them fell victims to the rifles of mechanics, clerks, or farmers, who spent a few dollars and a few days in the pursuit of the noblest game in North America, and made their kill in a gentlemanlike and sportsmanlike manner.

Under the old *régime*, when the 'rope' was paramount in the fall, and the moose-dog devastated the yards in the spring, such a successful season would have been out of the question. Instead of the kill being divided among a number of people (who incidentally disbursed cash enough among their guides to pay for the meat at far more than its market value), the killing would have been done by a number of unprincipled scamps, who were too lazy to work at any legitimate business. The best of the meat would have been peddled round the towns, and the forequarters left to rot in the woods.

Of course, much of the meat killed this season has been sold. Personally I do not believe in the sale of game, but I cannot blame a man who finds himself in possession of four or five hundred pounds of venison for selling enough of it to recoup him for the expenses of getting the meat out of the woods.

The lawful hunting season has been curtailed. Dogging is a thing of the past, and snaring is falling into disrepute. The modern rifle has not, in my opinion, worked the same slaughter the old smooth-bore or musket did when 'close season' was a byword and the moose-dog was one of the common objects of the country. I remember when moose were practically extinct in King's County. To-day there are moose within ten miles of the shire town. The same remark applies to other districts. The agents of the Game Society deserve a certain amount of credit for this; the people of the country have achieved the rest. With the renaissance of hunting as a national pastime, the condemnation of butchery and pot-hunting has followed as a natural sequence.

While the moose have increased, cariboo are all but extinct. I remember seeing over fifty cariboo in one drove, near Lake Paul, King's County, when I was a boy. To-day the cariboo of Nova Scotia may be said to consist of a few scattered droves. I believe that a few still exist in the region round Lake Rossignol and the 'Boundary Rock.' They are still fairly numerous in parts of King's and Annapolis Counties, and they are not yet extinct on the headwaters of Liscombe and St. Mary's Rivers, in the eastern part of the Province. They certainly have not been killed and sent to market. The timber-wolf, their worst enemy, is extinct in Nova Scotia; the wild-cat and the bear are less numerous now than they were in the days the cariboo frequented the bogs in hundreds. I am inclined to believe that some unknown disease is responsible for this.

The passenger-pigeon is practically extinct in America. I adduce the same cause for its extinction. The net and the gun depleted their ranks, but they could never have exterminated the race.

Against the practical extinction of the cariboo we can offset the introduction and increase of our deer. Deer are not indigenous to Nova Scotia, but a few years ago the Game Society imported a few pairs, and turned them down in Digby County. I believe the credit of this importation is largely due to Major Daley (of Digby) and H. A. P. Smith (High Sheriff of Digby County). Mr. Smith took an active part in catching the deer in the New Brunswick woods. The New Brunswick authorities were kind enough to accord the privilege of catching the deer to the Nova Scotia Game Society.

In spite of a certain amount of poaching, the deer have thriven well. Nearly every game-warden makes mention of them in his report. The fact that half a dozen pairs of deer have in ten years managed to escape destruction by poachers, bears, wild-cats, and disease, and to propagate to such an extent that no county in a province as large as Wales is without representatives, augurs well for the future of our Nova Scotian deer. I regret to say that many deer have been killed. Some very heavy fines have been imposed in flagrant cases, but a number of other cases have gone unpunished.

At the present time our large carnivora are represented by the bear alone. Bears are scarce in all the counties of the Province. They occasionally kill sheep and lambs, and now and then they kill a moose or cariboo calf. They prefer a diet of fish and berries to one of flesh, unless the meat is easy to obtain. The only other carnivorous animal worthy of mention is the wild-cat, or Canada lynx. He is a cowardly, skulking, destructive brute; his principal food is the Arctic hare, or 'Canadian rabbit.' He has a strong liking for sheep and lambs, does not disdain poultry, and is quite capable of killing a fawn or a cariboo calf, provided the dam is not too near.

I do not wish the readers of this paper to imagine for one minute that we have too much game in Nova Scotia, or that the visitor to this Province can count on a moose head as a certainty. The shooting of deer and cariboo is prohibited at present, and I hope it will be for many years to come. With only one moose allowed to one man, dogging extinct, snaring on the decrease, fire-wards appointed and paid to prevent forest fires, and many hundred sportsmen banded together in the People's Game Society, as well as in the Provincial Game Society, the outlook for the increase of big game is an encouraging one.

DISCOVERY OF A BIG-GAME PARADISE.

By DR. WILLIAM T. HORNADAY,

Director of the New York Zoological Park.

British Columbia is a land of illimitable mountains and much big game of the species most attractive to American sportsmen. But it is sharing the fate of the once-wild portions of the Rockies in our own country. Railroads are pushing through the valleys, mines are scarring the mountain sides, and the axe is laying low the valuable timber. The big game is going very rapidly, and already it is a common occurrence for a sportsman from 'the East' to cover the long trail to the Canadian Rockies for a grizzly bear and return unsuccessful.

It was left to an American sportsman to discover, and also protect from spoliation, the very finest hunting ground in all British Columbia. I say it is the finest, because its equal has not yet been pointed out. About six years ago Mr. John M. Phillips, of Pittsburg, with his guides Smith and Norboe, literally discovered the fact that in south-eastern British Columbia, between the Elk and the Bull Rivers, there lies—and also rises aloft—a wonderland of fine scenery that is richly stocked with big game. Last September Mr. Phillips again traversed it from end to end, and his estimate is that it contains to-day 1,000 mountain goats, 200 mountain sheep, at least 50 grizzly bears, 25 black bears, many mule deer and some elk. Besides the above it is well stocked with marten, lynx, wolverine, pikas, ground squirrels, red squirrels, snow-shoe rabbits, marmots, ptarmigan, blue grouse, fool-hens, harlequin ducks, and trout.

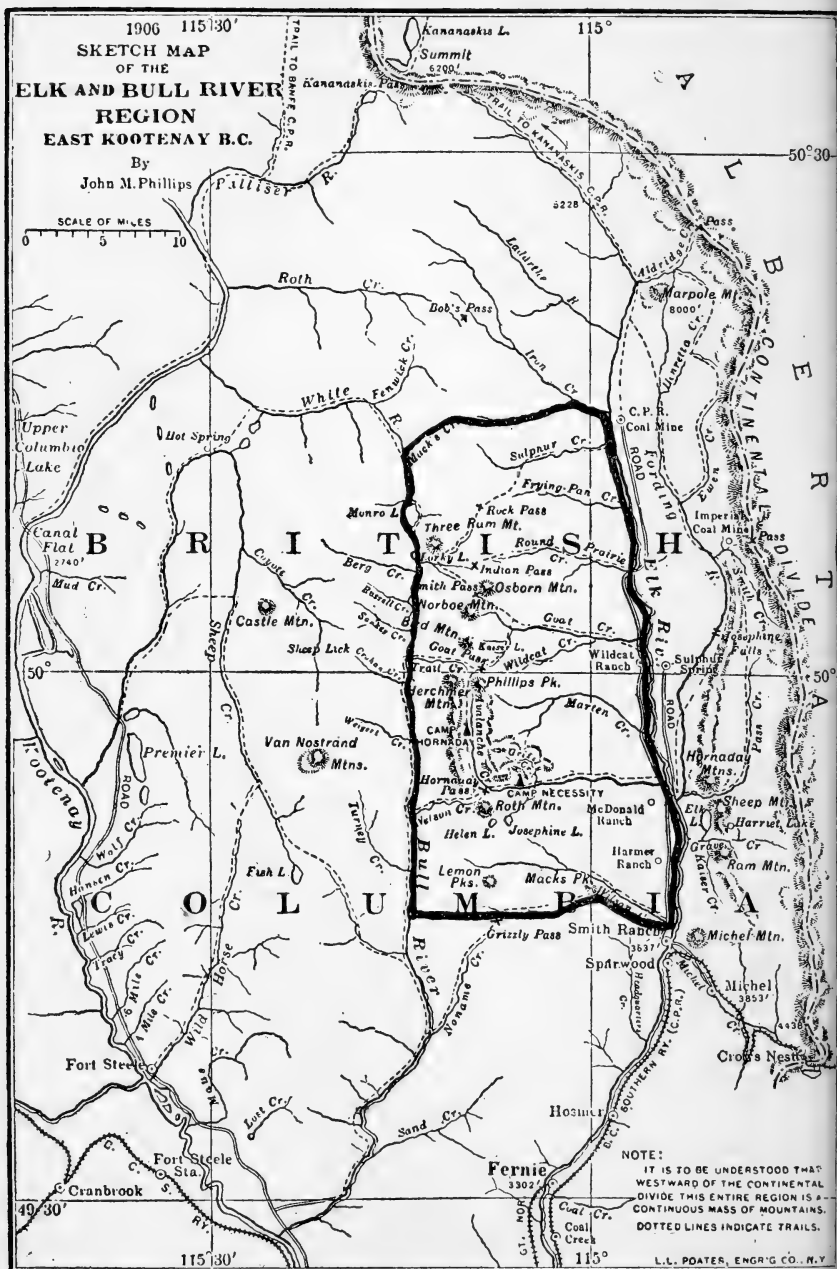
Last autumn Mr. Phillips and the writer felt it their duty to propose to the people of British Columbia that the area containing the wild life enumerated above should be set aside as a game and forest reserve, and protected accordingly. After long and careful consideration the boundaries for an ideal reservation were laid down on Mr. Phillips's map—the first map ever made of that region—and submitted to Premier McBride and the Executive Council of the Government of British Columbia. A memorial was also submitted setting forth in detail the reasons why the reserve proposed should be created, and the writer drafted a bill to carry the plan into effect.

From the outset the proposal has been received in a very friendly and even cordial spirit, and is now under serious consideration. The Press of British Columbia and Canada has placed the

matter fully before the public, and the result is awaited with much interest. The Natural History Society of Victoria promptly endorsed the idea, and recommended its adoption by the Government. At a recent meeting of the sportsmen of Victoria the basic principle of the proposition—the necessity for the establishment of game and forest reserves—was fully conceded, and the only question in the matter was declared to be of the best locations and boundaries. The recommendation of 'Goat Mountain Park' has been referred by the Government to the Provincial Game Warden, Mr. A. B. Williams, for examination and report. Possibly the approval of a definite site will be held in abeyance until Mr. Williams can have time to go over the ground in person, in which case a final report cannot be expected before next autumn.

The game reserve proposed by Mr. Phillips and the writer as Goat Mountain Park is shown on the accompanying map. It is about fifteen miles wide from east to west, by thirty miles long, and embraces the region between the Elk and Bull Rivers from Wilson's Creek to Monro Lake and beyond. It contains the breeding-grounds and the summer and winter feeding-grounds of the mountain goat, sheep, elk, and mule deer, and a great variety of scenic wonders. It contains no coal deposits, no agricultural lands, very little timber of commercial value, and at this date—thanks to the efforts of Mr. Phillips and his guides—it is absolutely unspoiled. So little shooting has been done within this area that the mountain goats do not yet know the meaning of the report of a rifle. The country is so easily accessible from the railway, *via* Michel, Fort Steele and Fernie, that even women and children can ride into the heart of it and enjoy it. For camera enthusiasts it is a paradise, no less. But the area is so small that a very few vigorous hunting parties could easily ruin it for ever, so far as its wild life is concerned, and for this reason immediate action is urged.

As usual, however, in all matters affecting real estate, a note of discord is heard. In view of the practical certainty that the Government will in the near future take action on the plan now before it, and possibly favourable action, a few persons are advocating the creation of a substitute game and forest reserve wholly to the north of that proposed by Mr. Phillips and the writer, and reaching up to the main line of the Canadian Pacific Railway. With a degree of indifference to their own interests that would be amusing were it not so serious, the influence of *the people of Fernie*—of all places in the world—is being exerted in behalf of the selection of a farthest-north site. Just why any sane persons in Fernie, the natural outfitting point for Goat Mountain Park, should desire to have the southern boundary of the reserve moved thirty miles farther away from them, is a mystery which remains to be explained. Surely the Stoney Indians of the North will owe the Fernie Game Protective Association a vote of thanks if the proposed game reserve is finally located within easy reach of the



From 'Camp-Fires in the Canadian Rockies.' Copyright, 1906, by W. T. Hornaday.

MAP SHOWING THE SITUATION OF THE PROPOSED FOREST AND GAME RESERVE.
Length 30 miles ; average width 15 miles ; total area 450 square miles.

murderous rifles and greedy appetites of the worst game destroyers in North America. Soon they will have exterminated all the big game within easy reach of their present mountain home—for it is said in Banff that they cannot be controlled—and then, hey! for the new hunting ground 'reserved' for them just south of the Canadian Pacific Railway main line!

The rival proposition is unfortunate. The location it proposes is not a specially fine home for big game. It is so difficult and so poorly stocked with wild life that hunting parties from Banff nearly always go elsewhere.

Let us hope that the Government of British Columbia will not permit an ideal territory to be ignored and finally ruined through lack of information on the part of those who should be the first to stand for a thing of demonstrated value. No matter how many game preserves are created elsewhere in British Columbia, Goat Mountain Park is so fine and so rich in the products of Nature that it deserves to be preserved for ever.

EXTRACTS FROM BLUE BOOK ISSUED
NOVEMBER 1906.

Enclosure 1 in No. 180.

BRITISH CENTRAL AFRICA PROTECTORATE.

Proclamation.

(Published in 'British Central Africa Gazette' of 31st October, 1904.)

'I hereby declare the following area to be a game reserve, and to be added to the areas set out in the eighth schedule to the said regulations:—

THE CENTRAL ANGONILAND RESERVE.

'Commencing at the Government Station of Dedza the boundary of the Central Angoniland Reserve shall follow the Dedza-Lilongwe Road as far as the point at which such road crosses the Tete River, and shall thence follow the Tete River up stream to its source in the Dzala-Nyama Mountains; thence it shall follow the course of the Dzala-Nyama Range in a more or less westerly direction to the source of the Katete River; thence it shall follow the course of the Katete River down stream to the point of its junction with the Lilongwe River; thence it shall follow the course of the Lilongwe River down stream to the point where that river is crossed by the Dedza-Dowa Road, thence it shall follow the Dedza-Dowa Road to the Government Station at Dedza, the point of commencement.

'(L.S.) ALFRED SHARPE,
 Commissioner.

'Zomba, British Central Africa,
'October 31st, 1904.'

KING LEWANIKA to MR. R. T. CORYNDON.

'Lealui, November 8, 1904.

'My Friend,—I have seen your letter of the 12th October, 1904, and understand what you say about the Game Law. I agree to the Law, if the Government will pay me *one-half* of all the proceeds

of all licences issued to hunters, that is those who come to my country for the purposes of hunting, and are not residents.

‘Also all those who are residents in my country, who hunt game under schedule No. 3 Administrator’s Licence.

‘Mr. Aitkens has read me the Law and explained it to me.

‘Your friend,

‘LEWANIKA.

‘R. T. Coryndon, Esq., Administrator,
‘North-Western Rhodesia.’

No. 191.

MR. LYTTTELTON to COMMISSIONERS SIR D. STEWART (*East Africa Protectorate*), SADLER (*Uganda*), and SWAYNE (*Somaliland*).

‘Downing Street, June 1, 1905.

‘Sir,—I have the honour to transmit to you the accompanying extracts¹ from speeches made by members of a deputation from the Society for the Preservation of the Wild Fauna of the Empire which I received on the 2nd of February last. You will observe from these extracts that the objects of the Society in asking for the interview were mainly to draw my attention to the necessity of providing for the formation and effective working of game reserves in Africa and for the proper control of the pursuit of game by natives.

‘2. In replying to the deputation, I stated that I did not think that there was any chance at the present moment of obtaining any contribution from the Imperial Exchequer in aid of the establishment of game reserves, but that I would consider carefully the question of such reserves in all the African Colonies and Protectorates. I agreed that the reserves should be brought, where feasible, along navigable rivers or railways, as suggested by the deputation, and that their size should be so restricted as to give them a fair chance of being effective.

‘3. I pointed out that the measures to be taken would necessarily be dictated by the amount of the funds which were available in the different Colonies or Protectorates and by the large amount of settlement which has taken place among the railways and the navigable rivers.

‘4. I am aware that much has already been done to protect the game in the $\left\{ \begin{array}{l} \text{East Africa} \\ \text{Uganda} \\ \text{Somaliland} \end{array} \right\}$ Protectorate, but, in view of the representations of the deputation, I shall be glad to receive any suggestions which you may offer for carrying out more fully

¹ No. 181: the portions enclosed in [].

the principles of the International Convention of the 19th of May, 1900. I have also to request that you will furnish me with a short report on the measures at present in force in regard to the preservation of game and on the existing reserves, together with a rough estimate of the numbers of the different varieties of game in the Protectorate.

‘ I have, &c.,

‘ ALFRED LYTTELTON.’

No. 211.

COMMISSIONER SWAYNE (*Somaliland*) to MR. LYTTELTON.

(Received December 9, 1905.)

[*Answered by No. 230.*]

‘ Somaliland, Commissioner’s Office, Sheikh,
November 21, 1905.

‘ SIR,—The duty of seeing that the provisions of the Regulations are carried out has been a difficult one for the Administrative Staff. During the various expeditions much game was shot, and, owing to the want of game rangers, infractions of the Regulations could only come to the ears of the officials accidentally, in conversation with officers and others. There was a very strong feeling amongst officers that free shooting should be allowed as some compensation for the hardships of service.

‘ There are no European settlers in the country.

‘ The Midgans, a servile tribe, are kept by wealthy Somalis to roam about in the debateable land of the Haud to guard the front of flocks, and they maintain themselves by hunting. I am endeavouring to get the tribes to give these people regular occupation with the flocks, and have succeeded to a certain extent.

‘ Without settled administration in the interior, any attempt to compel the tribes to adhere to measures designed to stop the rinderpest in cattle and game will prove to be ineffective. The tribes are very jealous of interference in their nomad life and would probably resent dictation.

‘ In order to protect both the hill game, such as greater and lesser kudu, which are very local in their habits, and the prairie game, such as oryx and hartebeeste, which yearly wander over large areas in search of grass, a hill reserve has been made in the central portion of the Golis Range, and a prairie and bush reserve, including the extensive Damal Plain, has been made in the high western country ending at Hargeisa.

‘ The reserves form a long strip lying east and west and touch each other, except that a right of way has been left between the two, by which sportsmen may penetrate into the Haud *via* the Jerato Pass. They are allowed to shoot on the march five miles on

either side of the track. Waggar Mountain and the hill tract west of the Sheikh Road, as also the Gadabursi and Jibril Aboker country, have been left open for the shooting of kudu.

‘The centre of the hill reserve is Armali, 30 miles due south of Berbera, where there is a Government Experimental Garden, and where the Commissioner forms his camp for a part of the year. The supervision of this reserve, some 120 miles in area, has been carried out without difficulty, and the reserve, which is generally densely wooded with cedar and box trees, contains numerous kudu and klipspringers. These animals never leave their own particular hills or valleys. Wart-hogs are found at the foot of the hills, and partridges are numerous. Panthers often kill men and animals, but are periodically destroyed by Europeans and natives. Lions now and then traverse the reserve, but seldom stay long, apparently preferring the flatter and more open country.

‘The reserve is a favourite grazing ground for cattle. Being on a ledge some 4,500 to 5,000 feet high, under the edge of the precipitous Golis Range, it obtains an abundant rainfall during both the rainy seasons, and grazing may consequently be found here when the country to the north and south is parched. The natives for this reason call this tract “Mirso,” the haven.

‘As the armed tribes are forbidden to bring their rifles back from the grazing grounds, there need be no danger on their account in the case of the “hill reserve.”

‘In the west the tribes have received few rifles, as they are more remote from the Dervishes, and I have arranged with Ras-Makonen that the numbers of rifles on both sides of the border shall, if possible, be kept within strict limits. For this reason we may hope that, with the expenditure of a certain amount of money on *personnel*, we may still be able to preserve what is left of the once numerous herds of oryx and hartebeeste, in spite of Abyssinian trespasses across the extreme western border.

‘Troops were during the recent expedition quartered at Hargeisa, but they have been withdrawn, and unless the Mullah moves westward to Heradigit again it is unlikely that we shall be obliged to again occupy Hargeisa. But it is essential that the Hargeisa Reserve, which at present is some 1,500 miles in area, be extended so as to include the prairies, which are the proper home of the larger antelopes.

‘I propose to extend the limits of the Hargeisa Reserve up to the Abyssinian border on the extreme west, so as to include a portion of the Ban-ki-Wajalyer prairie, and I would also extend the limits towards the south down to the ninth north parallel of latitude, taking in the Tuyo and Arori Plains.

‘The boundaries of this reserve would then run as follows:—Beginning at Lafarug in the north-east corner, it would go westward along the tenth parallel to its intersection with the forty-third east meridian at Sau, on the Abyssinian frontier, thence to

the intersection of the ninth north parallel with the forty-fourth meridian east. The southern boundary would run from this point eastward along the ninth parallel to the southern edge of Tuyo Plain at Edanka Tuyo, thence due north through the old boundary at Talawayer to the Jerato Pass, and so through Mandera to Lafarug.

‘ It may be considered that this area is very large, being about 80 miles by 64, and containing as it will some 5,000 square miles; but it must be remembered that Somaliland is in a very special position. The inequality of grazing, the vicissitudes of the seasons, the frequent failure of rain, the periodical sweeping movements of the nomad tribes, and the fact that there is a constant demand for oryx-hide shields, ostrich feathers, and gerenook prayer-carpets, compel the wild animals to annually move about over a larger tract of country than I imagine is the case elsewhere. From what I know from personal experience of the conditions in the Masai plains of East Africa, I am inclined to think that game wanders at least 100 miles there, and in Somaliland the conditions, compelling an annual change of locality, operate with, I believe, greater force.

‘ The expense of maintaining and properly supervising the two reserves should not exceed £500 per annum, allowing native game rangers, and an extra Political Officer in the west, who will, moreover, be available at all times for political work.

‘ As regards any further measures which may be advantageously taken for the protection of wild animals, I propose that the sale of all horns and skins and ostrich eggs be prohibited at Aden, as well as on the Somali coast, and I will address the Resident at Aden on this matter. Many heads and ostrich eggs are taken over from the British coast eastward of Berbera, to which part we have not yet extended our administration, except at Karam and Hais.

‘ Jackals and hyænas should be kept down.

‘ Summarising the above, we have, in addition to the Game Regulations, the following measures, the first three of which are now already in force:—

‘ 1. An annual close season, from the 15th of March to the 15th of June.

‘ 2. A rotation of royal game, kudu being particularly carefully watched.

‘ 3. The keeping down of hyænas, jackals, and rhinoceros-birds within harmless numbers.

‘ 4. The extension of the Hargeisa Reserve.

‘ 5. The expenditure of £500 per annum, and the addition of a Political Officer to take special charge, with a native staff.

‘ 6. The prohibition of the sale of horns, skins, and ostrich eggs at Aden.

‘ 7. The total prohibition of the hunting of elephants and hartebeeste for a series of years.’

APPENDIX 1.

Notes.

‘ The western part of Somaliland, more especially the south-western, is less arid than the eastern parts of the country, and has, therefore, favoured game to a greater extent.

‘ The great waterless¹ wilderness called the “ Haud,” which stretches across the centre of our Protectorate from the westward to Burao and Bohotleh, has, moreover, hitherto afforded a great natural sanctuary for wild animals. It is true that with the coming of the rainy season, when pools of water are formed, both our tribes from the north and their traditional rivals, the Ogaden,² from the south and west, penetrate with their flocks and herds far into the wilderness, but even then, a large neutral zone, created by the enmities of the tribes, is left vacant, and the game has, consequently, ample space wherein to find refuge. We have debatable land of this kind also around Burdab Mountain, and the game here, and more especially so on the eastern side, was formerly plentiful. The “ Sorl,” south of the Golis Range, behind Hais and Laskhorai, is another “ Haud,” and here the same conditions prevail, but although there are rhinoceros, and oryx and the smaller species of antelope are plentiful, there are, for some peculiar reason, no lions. Probably the eastern tribes, having been in possession of rifles for many years past, have exterminated them.³

‘ Certain districts containing many wells—districts which are continually being overrun by the tribes and their flocks and herds—contain comparatively little game. Such, for instance, is the Nogal district and Guban at the foot of the Golis Range.

‘ It will be convenient to roughly divide the country into two zones for game. One the “ Haud,” where thick bush alternates with great prairies, a succession of which sweeps around in a great concave arc from the Abyssinian frontier on the west to Burao and Bohotleh; and secondly, the mountainous country comprising the Golis Range, which runs all along the coast at varying distances inland from west to the east, closing in to the coast as it trends eastward, until at Hais it runs behind the sea-beach up to Cape Guardafui; and the Gadabursi and Jibril Aboker hill country. In the “ Haud ” prairies the game feeds in front of and precedes the people in their annual movements in the wake of the rain and grass, and covers an orbit of, perhaps, one hundred and fifty miles in its wanderings. There are also the coast prairies behind the Bulhar-Zeyla coast-line. Here the game probably covers one hundred miles in its migrations, but aoul (Soemmering’s gazelle) are very local, and may always be found at Manda and near

¹ Not rainless.

² Abyssinian tribes.—E. S.

³ The fact that other game here has escaped destruction is a hopeful feature perhaps for dibatag.—E. S.

Bulhar, in great numbers. In the hill tracts the wild animals, such as kudu, with the exception of what is really prairie game, are local, and keep to their own particular hills and valleys.

‘ There are no rivers or railways, and the only well-used routes from which the supervision of game could be facilitated are the caravan tracks used by the troops between Berbera and Hargeisa and between Berbera and Burao. On both of these routes, however, the movements of troops have driven the game away. At present, there is no game to speak of near the road worth protecting.

‘ My brother and I were employed in exploration surveys for the Government of India in 1891-1892. Times have much changed since then. The numbers of wild animals formerly in the country were astonishing. I remember in the rainy season of 1891 entering the rolling western plains, where, at an altitude of five thousand to six thousand feet, we came upon a bushless tract one thousand square miles in area, covered by short succulent grass. The whole ground was covered with immense herds of hartebeeste, oryx, and Soemmering’s and Speke’s gazelles, and troops of ostriches loomed up and disappeared in the folds of the prairie. On firing a shot the whole mass stampeded, one herd communicating its fears to another, until right up to the horizon there was a crowd of galloping animals. I counted four hundred oryx in one herd, and roughly dividing the masses as well as I was able into groups of the same size, I estimated that the total number of animals I then saw could not have been less than ten thousand. In the midst of the veldt we shot two out of three lions.¹ They were lying out on the short grass in full view, and had been clearly seen by us when yet two miles off. In the bush country south of the grassy plains lions were numerous. In two days’ surveying my brother and I killed, besides other game, two lions and five rhinoceroses. Every night we heard the roar of lions. They would frequently roar around our camp trying to stampede the camels, and they would continue roaring long after dawn. We frequently came on herds of elephants, and easily managed to shoot a few of the biggest bulls. I have known of several parties of sportsmen who have shot from twenty to thirty lions in a three months’ trip, and I know of two sportsmen at least who shot as many as eight lions before breakfast.

‘ It was the same in the hill tracts, the home *par excellence* of the kudu, both the lesser and the greater variety, and klipspringers. No day passed that kudu were not seen, and there was no temptation to shoot moderate-sized heads, which now would be considered good. Elephants roamed about Waggar Mountain, forty-five miles south of Berbera, and had tunnelled a path through the cedar forests and underwood right up to the tops of the moun-

¹ My brother was unfortunately badly mauled.—E. S.

tains. For many years the bones of elephants that had been shot were lying in Soksoode plains near Waggar, and at Mandera. Near Zeyla my brother saw elephants walking on the beach, and I shot one of my finest not forty miles from the coast at Lofodi. Lesser kudu were plentiful in the foot-hills. Like the greater kudu, they are never found far from water, and their habits very much resemble those of the cheetel, the axis deer of India.

‘The contrast between the past and the present is distressing. I have frequently travelled across the prairies since then, and I do not think I have ever seen more than a dozen animals at a time, excepting, perhaps, the common and unsought-after aoul. Hartebeeste have practically disappeared, and oryx are met in dwindled and scattered herds. Several herds of elephants remain in the west near Jalelo, Gibeli, and in the Gadabursi country, but these give a yearly toll to sportsmen and are gradually dwindling away.

‘The country inland east of Karam is not well known, having never been visited by officers of the Administration, except when I, in my military capacity, in 1902 carried an expeditionary force from Berbera inland behind the Golis Range to the top of the mountains at the back of Laskhorai. The tribes in this direction have never been administered inland, and no attempts have been made to bring the Game Regulations into force. I should say, from the little I was able to see at the time of my journey, that this part of the country does not contain so much game as the western part of the Protectorate, which is better known. At the same time, the “Haud” at the back of the hills, here called “Sorl,” has great possibilities, and I know that rhinoceros and oryx are to be found there in considerable numbers.

‘I do not attribute the reduction in the numbers of wild animals either to disease or to native hunting. Both of these factors have operated during the last hundred years, and the game as I saw it in 1891 had successfully coped with both.

‘The epidemic of rinderpest which in 1897 swept over the whole of Africa began in Harrar, and Somaliland was the first country to suffer, the cattle being nearly wiped out. Since then rinderpest has appeared periodically, keeping down the extraordinary recuperative powers of the hardy Somali breeds. Thus in 1899, 1901, 1903, it followed the cattle through the western prairies and the Golis Mountain Range. The hartebeeste in the west suffered enormously, and so did the kudu in the hills. Somalis have told me that, at certain seasons, they have every day gone out on foot and pulled down with their hands batches of sickly animals in order to strip the hides. The prairies were in 1899-1901 everywhere covered with bones, and in the hills heads of kudu were continually being brought in by natives.

‘There are no permanent villages, except at the coast, and a few small communities of religious men every hundred miles or so.

The tribes live in movable encampments, their small brown circular huts being made of camel mats.

' The Somali hunts on horseback and kills numbers of oryx and ostriches by riding them down. The bull oryx is prized for his thick hide, shields being made out of the shoulder-piece. Every Somali buys a dozen or so of these shields during his lifetime. Thus the execution must be great. When rain has fallen in the "Haud," oryx become hogged and may be easily caught on foot. When lions have killed men of note, the young men turn out on horseback and gallop round and round them. As the lion swiftly turns around in a cloud of dust, he becomes dazed and is plied with poisoned arrows. Hyænas, which are a greater scourge to the flocks by far than lions, are killed by pit-falls furnished with a short spear-blade. In the west rhinoceroses are killed for the sake of the hide, which cuts up into seven good shields, leaving besides some strips for making whips.

' Midgans, a servile aboriginal and hunting tribe, use bows and poisoned arrows, wearing game down by following them night and day, using a camel as a stalking horse; or they make long lines of thorn fence across the jungle, setting springes in cleverly contrived openings. Gerenook (Waller's gazelle) are caught in this manner, the skin being in great demand to convert into soft prayer-carpets. Midgans catch young ostriches and domesticate them.

' But none of these causes do more than place temporary checks on the increase of game. The proof is that the game has survived them all during hundreds of years.

' I attribute the diminution of game entirely to the importation of modern rifles, and so far, leaving aside the Abyssinians who, since the rectification of the western boundary in their favour, have with their paid Midgan gunmen overrun the western plains, practically wiping out in a few years the great numbers of hartebeeste and oryx which formerly swarmed there, and have cut off the supply of elephants at its source in the highlands of Harrar; omitting also the tribes who have only recently been armed, and who, although they must undoubtedly be reckoned on as a factor in the future, have so far done comparatively little harm,—leaving aside the above, I attribute the diminution of game almost, if not entirely, to European sportsmen and to the movements of troops. These have prevented game from recuperating after rinderpest and disease, as it formerly used to. No doubt the Ogaden, who have recently purchased many rifles from Abyssinian soldiers, are rapidly destroying the wild animals, but these people do not live within the British Protectorate.

' The slaughter in the Protectorate has been great during the presence in the country of the various expeditionary forces, when it was impossible, in spite of every effort, to obtain general recognition of the Game Laws. Not only did a large proportion of the

five hundred or six hundred officers in the country shoot with or without a licence, but I know of several cases where, although sheep were at all times easily obtainable, the Sepoys were habitually allowed to kill as much game as they wanted, and no check was apparently placed upon the shooting of females. With the departure of the troops, this indiscriminate slaughter has happily become a thing of the past.

‘ I think it will be generally recognised that year by year wild animals suffer from increasing disadvantages. Rifles continually improve, but animals obtain no countervailing advantages. Whereas formerly a knowledge of woodcraft, without which the sportsman could not get within range of his animal, was incumbent, men nowadays lie down with their flat-trajectory small-bore rifles on the grassy veldt, and open fire at from four hundred to five hundred yards, and if they happen to be good shots, they easily kill their animals, whilst if they are indifferent shots, they may send them away maimed, to be killed in the night by hyænas. As a sportsman, and in the interests of sport such as I think it should be, I am strongly in favour of a general agreement to restrict the use of rifles to a bore not smaller than .577. The sport would gain by the reviving of the now fast disappearing art of woodcraft, but I am afraid that the idea is Utopian, and would not commend itself to most modern sportsmen, many of whom, knowing that they may never come again, are possessed of a wish to carry away as many trophies as possible, and thus make good the fees which they have paid for a licence.

‘ E. J. E. SWAYNE.

‘ November 22, 1905.’

APPENDIX 5.

‘ Commissioner’s Office, Somaliland Protectorate,
Sheikh, November 23, 1905.

‘ Sir,—I have the honour to request that you will take into your consideration the question of the feasibility of bringing into force at Aden regulations which will assist this Administration in ensuring the observance of the “ Somaliland Game Regulations, 1901,” a copy of which has already been submitted to you.

‘ The actual administration does not as yet extend to the eastern part of the Protectorate, and there are as yet no establishments there to cope with the export of game trophies, which are offered for sale at Aden.

‘ At the same time the preservation of interesting varieties of wild animals as contemplated by the International Convention of the 19th of May, 1900, to which Great Britain has acceded, is a matter of scientific importance, and is engaging the close attention of all parties to the Convention.

‘ I think that the prohibition of sale at Aden would be of very material assistance to the cause, and I have, therefore, informed the Colonial Office that I am addressing you on the matter.

‘ The paragraph of the Regulations affected is No. 6, which runs as follows:—

“ 6. No person shall within the Protectorate sell, or purchase, or offer, or expose for sale any ostrich eggs or any head, horns, skin, or flesh of any animal mentioned in any of the schedules, unless the ostrich or animal has been kept in a domesticated state; and no person shall knowingly store, pack, convey, or export any part of any animal which he has reason to believe has been killed or captured in contravention of these Regulations.”

‘ I have, &c.,

‘ E. J. E. SWAYNE,

‘ Brigadier-General.

‘ The Political Resident, Aden.’

Enclosure in No. 217.

‘ ANNUAL RETURN OF GAME KILLED DURING THE YEAR 1905.

	Number and Sex of Animals Killed	
	Male	Female
Lion	1	—
Rhino	1	—
Dero	46	5
Dibatag	11	—
Oryx Beisa	5	10
Strepsiceros (Kudu)	10	—
Strepsiceros Imberbis	5	—
Klipspringer (Alikout).	4	1
Wild Pig (Wart-hog)	7	2
Hartebeeste	5	—
Gerenook	40	2
Leopard	2	—
Hyæna	5	—
Aoul	36	7
Dik-dik	14	4
Total	192	31

‘ H. E. S. CORDEAUX,

‘ Deputy Commissioner.’

No. 217.

COMMISSIONER SWAYNE (*Somaliland*) to the EARL OF ELGIN.

(Received March 24, 1906.)

‘Somaliland, Commissioner’s Office, Berbera, March 12, 1906.

‘My Lord,—I have the honour to submit the Annual Return of Game killed in the Protectorate “under Public Officers’ Licences,” as submitted to me by the Deputy Commissioner, Berbera.

‘I regret the delay.

‘I have, &c.,

‘E. J. E. SWAYNE,

‘Brigadier-General.’

No. 223.

COMMISSIONER SADLER (*East Africa Protectorate*) to the
EARL OF ELGIN.

(Received May 30, 1906.)

[*Ordinance sanctioned August 1, 1906.*]

‘Commissioner’s Office, Nairobi, April 17, 1906.

‘My Lord,—I caused the Game Ordinance (No. 9 of 1906) to be published in the last number of the “Official Gazette,” and I have now the honour to transmit herewith eight copies. The Crown Advocate’s covering despatch reviewing the circumstances in consequence of which the promulgation of the Ordinance was thought desirable was forwarded in my despatch of March 6th.¹

‘2. I have been, as Your Lordship is aware, in communication with the Acting Commissioner of Uganda in order to ensure that the legislation of the two Protectorates in this respect should correspond as closely as possible, and in deference to the wish expressed in his telegram of the 15th ultimo, a copy of which is enclosed for Your Lordship’s information, a sub-section has been added to Section 7 of the Ordinance empowering the Commissioner to make rules legalising the export in transit through this Protectorate of any ivory lawfully acquired in Uganda, even though of less weight than the minimum which we permit.

‘3. The rules in question, copies of which accompany this despatch, were drawn up and will be published in the “Official Gazette” of May 15th.

‘I have, &c.,

‘J. HAYES SADLER.’

¹ No. 218.

EAST AFRICA PROTECTORATE.

Rules.

‘ Rules issued by His Majesty’s Commissioner for the East Africa Protectorate under Section 7 Sub-section (6) of the East Africa Game Ordinance, 1906.

‘ J. HAYES SADLER,

‘ His Majesty’s Commissioner.’

‘ Nairobi, dated this 2nd day of May, 1906.

‘ 1. No elephant tusk weighing less than 30 lbs., and no piece of ivory which in the opinion of an officer engaged in the Civil Administration of the East Africa Protectorate formed part of a tusk under 30 lbs. in weight shall be introduced into the East Africa Protectorate from the Uganda Protectorate unless it shall have been stamped with an official stamp and a registered number by a Customs Officer or Officer engaged in the Civil Administration of the Uganda Protectorate.

‘ 2. The fact that an elephant tusk or piece of ivory bears an official stamp and registered number as required by the preceding rule shall be *prima facie* evidence that the tusk or piece of ivory was lawfully collected and possessed in the Uganda Protectorate and such tusk or piece of ivory may be imported from the East Africa Protectorate.

‘ J. HAYES SADLER,

‘ His Majesty’s Commissioner.’

*Enclosure in No. 224.*HABITAT OF THE GAME ANIMALS OF SOMALILAND,
WITH ROUGH SKETCH MAP.

‘ The map roughly represents Somaliland, the red line the British sphere of influence, the dotted lines roughly divide it into five sections, as follows:—

- ‘ 1. The desert country near the coast.
- ‘ 2. The Golis Mountains.
- ‘ 3. The waterless, though not desert, country called the Haud.
- ‘ 4. The extreme east of the Protectorate.
- ‘ 5. The extreme west of the Protectorate.
- ‘ There are seven species indigenous to Somaliland alone:—
 - ‘ *Gazella Pelzeni*, in section 1 of map, between Berbera and Bulhar, requires protection.
 - ‘ Baira, in section 2, is found near Doodobar, on a spur of the Golis Mountains, and possibly on some of the solitary barren hills in section 1. Very rare, requires protection.
 - ‘ Somali Wild Ass, section 2, in mountains to the south of the

Sheikh Pass and, according to native report, in section 4. Very valuable, should be carefully protected.

‘Dik-diks (*Madoqua Swaynei* and *M. Phillipsi*), all over sections 2 and 3. The female always dashes first out of a bush; horns of male so small that they are difficult to see. They are the prey of leopards, the smaller carnivora and birds of prey, and should be protected.

‘Clarke’s Gazelle (*Ammodorcas Clarkei*), in section 3, near Gimba. A most remarkable antelope, confined to a district about 50 miles north and south. Should be protected if possible.

‘Swayne’s Hartebeeste (*Bubalis Swaynei*), in section 3, confined to districts in the Haud, near Toyo. Requires protection.

‘There are ten other species excluding carnivora, and these are found in other parts of Africa as well as in Somaliland.

‘Elephant, in section 5, in the Gadabursi country. I believe they should be absolutely protected.

‘Greater Koodoo, in section 2, in the Golis Mountains, also a few in the extreme south of section 3, and, I believe, in section 5, in the Gadabursi country, but their principal habitat is the Golis Mountains. Require protection.

‘Lesser Koodoo, in section 2, in the foothills of the Golis Mountains and just north of Hargeisa. Should be protected.

‘Klipspringer, in section 2, in the Golis Mountains. Should be protected.

‘Waller’s Gazelle, scattered over section 3. A very remarkable antelope, should be protected.

‘Ostrich, scattered over section 3. Should be protected on account of its value.

‘The four remaining species are found scattered over section 3, and a few on the borders of section 2. These species are Soemmering’s and Speke’s Gazelles, Oryx, Wart-hog. They would be all the better for some protection, but do not require it so urgently as the rest.

‘FREDERICK GILLETT.’

No. 232.

(Received in Colonial Office, August 8, 1906.)

OFFICIAL GAZETTE OF THE HIGH COMMISSIONER FOR SOUTH AFRICA.

PROCLAMATION BY HIS EXCELLENCY THE HIGH COMMISSIONER.
(No. 16 of 1906.)

‘Whereas it is expedient to amend Proclamation No. 1 of 1905, relating to the preservation of game within the territory

74 THE SOCIETY FOR THE PRESERVATION OF

defined by the Barotziland-North-Western Rhodesia Order in Council, 1899 (hereinafter referred to as "the territory"):

' Now therefore under and by virtue of the powers in me vested I do hereby declare proclaim and make known as follows:—

' 1. Notwithstanding anything in Section *five* of Proclamation No. 1 of 1905 contained:

' (a) the holder of a Special Licence may under such licence hunt and kill the following animals mentioned in Schedule Three of the said Proclamation that is to say three eland bulls and one koodoo bull;

' (b) the holder of a Special Licence may under such licence hunt and kill any game mentioned in the said Schedule Three save and except elephant giraffe and rhinoceros; provided that game authorised hereby to be hunted under a Special Licence be within an area infected with tsetse fly the burden of proving which shall in any prosecution lie upon the person hunting such game;

' (c) any European member of a recognised Missionary Society which carries on its work in the territory may under the authority of an ordinary licence hunt and kill game mentioned in Schedule Two of the said Proclamation not exceeding ten head of such game.

' 2. Notwithstanding anything in Sections *twenty-four* to *twenty-nine* inclusive of the said Proclamation it shall be lawful for any person being the holder of a Special Licence or Administrator's Licence to export free of duty any game which may have been hunted under the authority of such licence not exceeding three heads of each variety of such game.

' 3. This Proclamation shall have force and take effect from the date of its publication in the *Gazette*.

' GOD SAVE THE KING.

' Given under my Hand and Seal at Pretoria this Eleventh day of July One thousand Nine hundred and Six.

' SELBORNE,

' High Commissioner.

' By Command of His Excellency the

' High Commissioner.

' C. H. RODWELL,

' Imperial Secretary.'

HIGH COMMISSIONER'S NOTICE No. 77 OF 1906.

' It is hereby notified that the Administrator of Barotziland-North-Western Rhodesia, in the exercise of the powers on him conferred by Section *three*, Sub-section (d), of Proclamation No. 1

of 1905, has prescribed that the holder of a Special Licence or Administrator's Licence under such Proclamation shall not kill, under any such licence, sable antelope in a greater number than five bulls and two cows, and zebra to a greater number than three.

‘ By Command of His Excellency the

‘ High Commissioner.

‘ C. H. RODWELL,

‘ Imperial Secretary.

‘ Johannesburg, July 10, 1906.’

ANNEX IV.

SUMMARY OF GAME KILLED UNDER LICENCE IN THE DISTRICTS OF NYASALAND DURING THE YEAR ENDING
MARCH 31, 1907.

Districts in which Killed	Elephant		Rhinoceros		Gnu Wilde-beest		Hippopotamus		Zebra		Sable or Roan		Kudu		Eland		Buffalo		Dik Dik		Smaller Monkeys		Marabouts		Egret		Antelopes		Gwapi		Wild Pig		Jackal		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Port Herald (Lower Shire)	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Chiromo (Ruoi) ...	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Chikwava (West Shire) ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Mlanje (Mlanje) ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Blantyre (Blantyre) ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Zomba (Zomba) ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Chikala (Chikala) ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Liwonde (Upper Shire) ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Fort Johnston (South Nyasa)	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Kota-Kota (Marimba) ...	14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Dowa (Central Angoniland)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Dedza (Central Angoniland)	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Lilongwe (Central Angoniland)	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Chintchehe (West Nyasa) ...	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Karonga (North Nyasa) ...	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Mombera (Mombera) ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Total ...	35	2	1	—	6	—	22	27	41	13	91	36	55	5	20	1	1	1	3	1	6	—	11	—	5	13	46	3	35	7	42	16	1	8	

ANNEX IV.—*continued.*

SUMMARY OF GAME KILLED UNDER LICENCE IN THE DISTRICTS OF NYASALAND—*continued.*

Districts in which Killed	Warthog		Bush Pig		Hartebeeste		Impala		Reedbuck		Duiker		Klip-springer		Steinbuck		Waterbuck		Bushbuck		Puku		Leche Waterbuck		Inyala		Lion		Leopard		Hyena		Total	
	M F		M F		M F		M F		M F		M F		M F		M F		M F		M F		M F		M F		M F		M F		M F		M F			
Port Herald (Lower Shire)	6	—	—	—	1	5	—	11	2	2	1	—	2	—	—	—	5	—	11	7	—	—	—	2	—	—	—	—	—	—	—	—	45	
Chiromo (Ruoi)	11	4	—	—	1	9	3	26	30	5	12	—	6	—	—	—	63	16	34	13	—	—	—	1	—	—	—	—	—	—	—	—	263	
Chikwawa (West Shire)	11	—	—	—	5	7	—	5	5	5	6	—	—	—	—	—	24	4	22	4	—	—	—	—	—	—	—	—	—	—	—	—	173	
Mlanje (Mlanje)	15	1	19	3	16	2	4	45	11	10	4	—	4	1	—	—	20	8	36	11	—	—	—	—	—	—	—	—	—	—	—	—	243	
Blantyre (Blantyre)	15	1	—	—	26	2	—	1	28	7	9	—	4	1	13	3	20	6	26	4	—	—	—	—	—	—	—	—	—	—	—	—	215	
Zomba (Zomba)	10	2	20	—	17	9	—	4	26	1	10	—	2	—	—	—	5	3	16	1	—	—	—	1	—	—	—	—	—	—	—	—	173	
Chikala (Chikala)	4	—	—	—	1	7	—	—	17	—	—	—	—	—	—	—	—	—	1	2	—	—	—	—	—	—	—	—	—	—	—	—	87	
Liwonde (Upper Shire)	13	1	1	3	26	14	19	4	16	5	18	—	4	—	—	—	29	11	8	3	—	—	—	—	—	—	—	—	—	—	—	—	230	
Fort Johnston (South Nyasa)	9	1	4	3	33	11	9	3	31	3	14	6	4	—	—	—	36	6	34	16	—	—	—	11	4	—	—	—	—	—	—	—	299	
Kota Kota (Marimba)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	151	
Dowa (Central Angoniland)	2	6	6	4	11	5	—	1	26	15	3	6	5	—	3	3	9	3	3	2	—	—	—	—	—	—	—	—	—	—	—	—	115	
Dedza (Central Angoniland)	—	—	—	—	—	—	—	6	5	20	10	5	2	—	—	—	5	—	4	1	—	—	—	—	—	—	—	—	—	—	—	—	87	
Lilonge (Central Angoniland)	—	—	—	—	4	6	1	5	2	30	16	30	8	4	1	—	4	1	4	3	—	—	—	—	—	—	—	—	—	—	—	—	157	
Chintochi (West Nyasa)	—	—	—	—	—	—	—	—	9	5	2	3	—	—	—	—	3	1	4	3	—	—	—	—	—	—	—	—	—	—	—	—	64	
Karonga (North Nyasa)	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	267	
Mombera (Mombasa)	20	11	—	—	1	1	12	1	51	14	7	8	3	—	—	—	37	3	13	8	—	—	—	3	1	—	—	—	—	—	—	—	—	38
Total	112	27	62	19	178	102	91	26	348	107	142	57	31	8	20	6	278	71	220	75	16	2	3	—	15	4	3	5	17	4	1	2	2,607	

RETURN OF WILD ANIMALS KILLED IN THE GAMBIA PROTECTORATE DURING 1906-7 SEASON.

Province	Elephant	Senegambia Buffalo (<i>Bos caffer planiceros</i>)	Congo Buffalo (<i>Bos caffer magnus</i>)	West African Hartebeeste (<i>Bubalis major</i>)	West African Eland (<i>Taurotragus derbianus</i>)	Kovigian Hartebeeste (<i>Dama- liscus covungum typicus</i>)	Red flanked Duiker (<i>Cephalophus rufilatus</i>)	Crowned Duiker (<i>Cephalophus coronatus</i>)	Gambian Oribi (<i>Oribia nigricaudata</i>)	Waterbuck (<i>Cobus defassus unctuosus</i>)	Buffon's Kob (<i>Cobus Kob</i>)	Nagor Reedbuck (<i>Cervicapra redunca</i>)	Koan Antelope (<i>Hippotragus equinus gambianus</i>)	West African Sitatunga (<i>Tragelaphus gratus</i>)	West African lesser Bush Buck (<i>Tragelaphus scriptus typicus</i>)	Warthog	Red River Hog	Hippopotamus	Lion	Leopard	Total head
North Bank	26	..	..	2	..	17	7	..	22	..	..	..	..	1	86
McCarthy Island	5	..	..	11	..	..	3	..	..	19
Upper River	7	..	..	10	10	17	13	3	22	15	..	30	12	..	4	..	4	147
South Bank	35	..	..	19	16	..	..	..	3	73
Combo and Fogni	5	..	..	..	..	12	4	..	..	32	..	..	..	..	53
	18	..	..	41	10	17	15	3	91	26	..	82	60	..	7	..	8	378

A RECENT PUBLICATION.

'THE MAN-EATERS OF TSAVO.'

Most readers of the Journal have probably heard of the man-eating lions who exercised a reign of terror which lasted for several months and seriously impeded the construction of the railway in British East Africa. A full account of their doings and the methods by which they were finally destroyed has now been published by Colonel Patterson, and the story is of absorbing interest. The book ('The Man-eaters of Tsavo,' by Lieut.-Colonel J. H. Patterson, D.S.O. With a foreword by F. C. Selous. Macmillan & Co.) is one that should be read by all who are interested in big game, for the account which Colonel Patterson gives would be almost incredible were the veracity of the writer not unimpeachable. Much of interest will also be found on British East Africa, on the construction of the railway, on the natives, and on shooting. We cannot do better than quote a passage from Mr. Selous's preface: 'From the time of Herodotus until to-day lion stories innumerable have been told and written. I have put some on record myself. But no lion story I have ever heard or read equals in its long-sustained and dramatic interest the story of the Tsavo man-eaters as told by Colonel Patterson. A lion story is usually a tale of adventures, often very terrible and pathetic, which occupied but a few hours of one night; but the tale of the Tsavo man-eaters is an epic of terrible tragedies spread over several months, and only at last brought to an end by the resource and determination of one man. It was some years after I read the first account published of the Tsavo man-eaters that I made the acquaintance of President Roosevelt. I told him all I remembered about it, and he was so deeply interested in the story—as he is in all true stories of the nature and characteristics of wild animals—that he begged me to send him the short printed account as published in the *Field*. This I did; and it was only in the last letter I received from him that, referring to this story, President Roosevelt wrote: "I think that the incident of the Uganda man-eating lions, described in those two articles you sent me, is the most remarkable account of which we have any record. It is a great pity that it should not be preserved in permanent form." ' In recommending Colonel Patterson's plain, modest, and straightforward account of his unique adventures, one may add that there is not a word of exaggeration in the praise bestowed upon his book by Mr. Selous and President Roosevelt. No one who reads it can be disappointed, and he must be cold-blooded indeed who does not feel a thrill of exultation when the two man-eaters are finally destroyed.



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